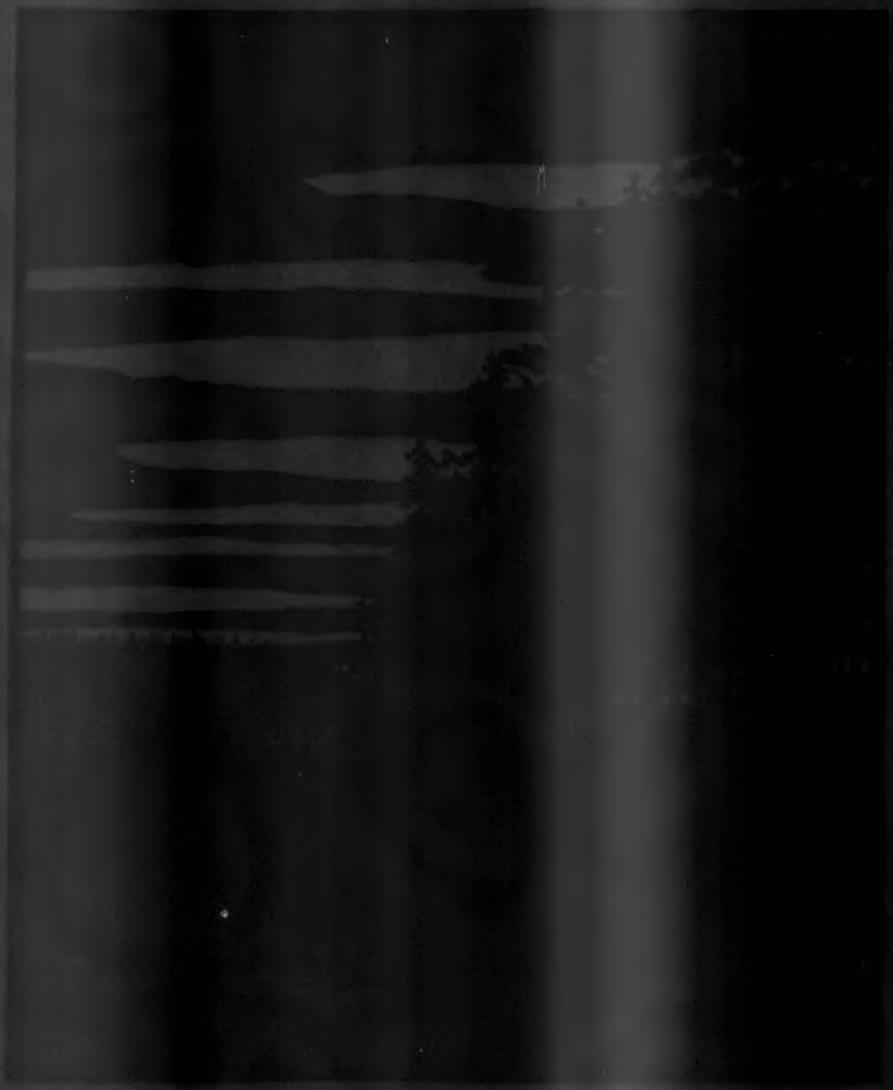
VOLUME 22 DECEMBER 1916 NUMBER 276

American Forestry



An Illustrated Magazine about Forestry and Kindred Subjects Published Each Month by the American Forestry Association

Washington, D. C.

Decayed Lumber in a Corn Crib (Courtesy U. S. Forest Service)

A Reason Why Substitutes Are Used

LUMBER would not now be engaged in a "war on substitutes" if its proper utilization had been taught a decade ago.

Lumber has so many natural advantages that the lost ground can easily be regained, but use must be made of every possible aid.

Lumber's chief aid is Creosote Oil. It prevents decay, makes wood *more durable,* and consequently *more valuable.*

In the case illustrated above it was logical for the farmer to replace the rotted wooden crib with a steel crib, and to lose faith in lumber as a building material for similar structures.

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Since we introduced Grade-One Liquid Creosote Oil numerous imitations have appeared on the market. For ease of identification, therefore, we have decided to change the name of this product and hereafter it will be known as BARRETT'S CARBOSOTA—Grade-One Liquid Creosote Oil.

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AMERICAN FORESTRY

The Magazine of the American Forestry Association

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NOMINATIONS FOR MEMBERSHIP

A special request is made to members of the American Forestry Association to nominate for membership, friends whom they believe will be interested in the work of the Association and who would like to secure the magazine, American Forestry.

I Nominate for Membership:

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Signed..... **Address**.....

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Knowing vs. Guessing

Every lumberman knows, of course, that even laboratory care would not make it possible to measure every board foot in a tract of standing trees. Even a LACEY REPORT is, in the strict sense, an estimate.

It is perfectly true, however, that the more elaborate the care and the greater the proportion of actual measurement, the nearer to the actual facts an estimate becomes. The skill and experience of the expert timber cruiser are most necessary, but no amount of skill and experience can take the place of science, care and double checking.

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AMERICAN FORESTRY

VOL. XXII DECEMBER 1916 No. 276

The Red Spruce

Identification and Characteristics

BY P. L. BUTTRICK

THE naming of almost any section of our country brings to mind some particular tree, nowhere more than in the Northeast where the tree is spruce. The association is so close that the forester calls the region the "Spruce Northeast," but to most it is known as the "North Woods"—a storied land so graphically described by a host of writers from Henry David Thoreau to Doctor Van Dyke. This northern forest stretches across the continent from the Maritime Provinces of Canada to Alaska. In the United States it is confined to northern and eastern Maine, northern New Hampshire and Vermont, the Adirondack Mountains of New York, and a broken and disconnected strip along the high summits of the Appalachians to North Carolina.

There are forests more impressive by their regularity and the size of their trees than the spruce forest of the Northeast. For sheer grandeur it is not to be compared with the great forests of the Pacific Coast, or even the white pine stands of the Lake States. It lacks the spaciousness and openness of the longleaf pine barrens of the South, or the quiet beauty and intimacy of the eastern hardwood forests. Yet it has a beauty and fascination of its own. To many it is the most beautiful of forests. It casts its fascination over all who visit its shades. The lakes of Maine, the White Mountains of New Hampshire, and the Adirondacks are among the oldest and best known vacation grounds in America.

There are three species of spruce found in the United States, three of them being found in the region. They are named, as is so common in the case of trees, after certain colors. In this case white, black and red. The white spruce (*Picea canadensis*) is so called because of its grayish white bark. It occurs sparingly along the northern borders of the United States and the Black Hills of South Dakota. It is more characteristic of Canada than the United States and is found from Nova Scotia to Alaska and almost to the Arctic Ocean. It makes up the bulk of the vast spruce forests of Quebec and Ontario.

BRANCH OF RED SPRUCE

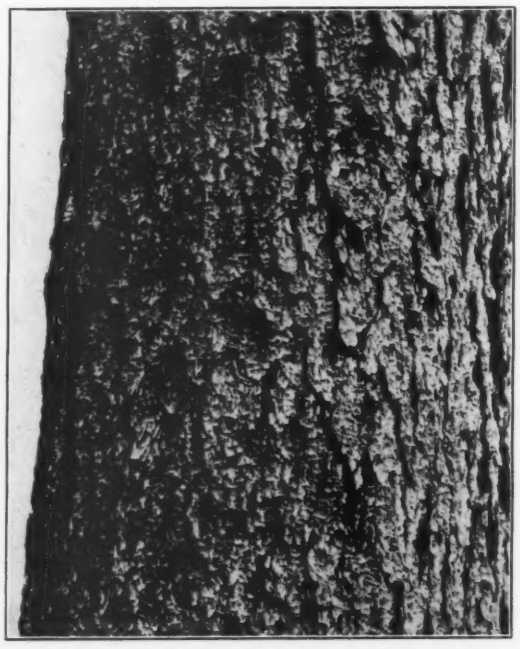
The cones are from one and a quarter to two inches long and reddish brown. The needles are dark green to yellowish green.

The white spruce is the largest and handsomest of the eastern spruces. It occasionally attains a height of 150 feet and a diameter of 3 or 4 feet. It has a narrow and symmetrical conical shaped crown, and is usually very beautiful. Because of the odor given off by its leaves when crushed it sometimes bears the more graphic than elegant title of skunk spruce.

The black spruce (*Picea mariana*) enjoys its name from the very dark cast to its leaves and occupies much the same range as the white, but is more common in the United States. It is a small and straggling tree, mostly confined to swamps and semi-barren hilltops. Its only value lies in the occasional specimens which happen to get large enough to be harvested with red or white spruce (*Picea rubens*). It is difficult for any but the expert to distinguish absolutely between these two trees, indeed for many years they were considered as one

species. It is not an important matter however.

The red spruce, or *epinette rouge* of the French Canadians, seems to derive the descriptive part of its name from the reddish-brown cast to the bark of the mature tree, yet in the woods where it is common it is known simply as spruce, but the others are referred to by name. Its scientific name is the Latin equivalent of its English and French and is in no way remarkable. The tree is not noted for its great size, although it is far from a small tree. Specimens exceeding 100 feet in height are unusual and trunks 4 feet through are likewise rare. Trees in the forest average 2 feet in diameter and from 60 to 80 feet high. Mature red spruce has a rather open, wide spreading crown. It is composed of a few large, irregular branches which droop more or less, but are upturned toward their tips. The crown lacks the narrow conical aspect of white spruce, or the broad pyramidal effect of Norway spruce.

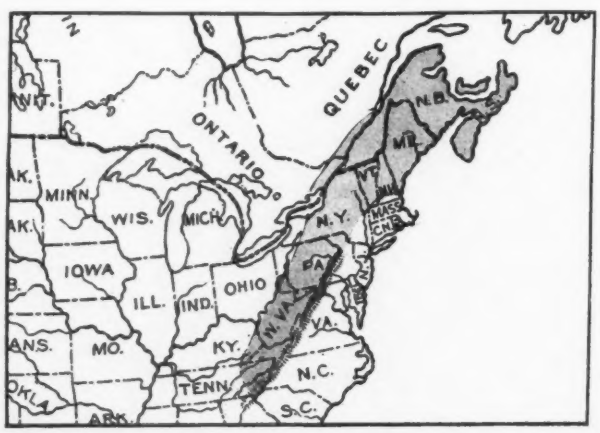


BARK OF RED SPRUCE

The red spruce has a much more restricted range than the others. The Maritime Provinces, Quebec, eastern Ontario and western New York State mark its northern and western boundaries. It extends further south, however, than the others, for it follows the higher summits of the Alleghenies and Appalachians clear to North Carolina, where it can be found growing within a few miles of the cotton fields and the vastly different flora of the southern forests. The black spruce also follows the mountains southward but to a lesser degree. Some botanists consider the spruce of the mountains another species, giving it the name of *Picea australis;* but the points of distinction between it and the common form, if they exist at all, are too microscopic to interest the forester greatly or the lumberman in the least.

The idea must not be gotten that a solid body of spruce is to be found along the tops of all the mountains in the Appalachian chain. It is only here and there on the summits of the highest peaks and ranges that they are found. Small bodies exist in the Poconos in northeast Pennsylvania and a few tracts were until recently to be found in central Pennsylvania. West Virginia contains the largest bodies of any of the Appalachian States. In the eastern part of the State at elevations above 2400 feet originally there was a fine spruce forest covering about 1,500,000 acres. So great have been the ravages of fire, insects, diseases and man that it is doubtful if 200,000 acres of this remain in virgin timber. A few mountain tops in Old Virginia are capped with spruce forests, but no considerable bodies occur. In North Carolina, where the Appalachians reach their greatest height the spruce forest makes its southernmost stand. It seldom occurs below 5000 feet. The best known area is the Black Mountains, the highest peak of which is Mount Mitchell, also the highest point in America east of the Mississippi River. The name Black Mountains was suggested by the dark color due to the dense masses of spruce on the summits. It was given to the range long before it was explored by Doctor Mitchell who lost his life and left his name on its highest peak. The largest body of spruce is in the Great Smokies, the wildest and most remote mountain range in eastern America. Here above a belt of hardwoods, unsurpassed in the temperate zone, there extends a long band of magnificent spruce timber. Small bodies of spruce cling, like shipwrecked sailors to the masthead of a sinking vessel, to the summits of a few other scattered peaks.

Except on mountain tops or deep swamps, spruce seldom occurs pure over large areas. Its most common associates are hardwoods, beech, birch and maple being particularly common. The combinations of types and species in the spruce region are numerous and often bewildering.



AREA OF RED SPRUCE GROWTH

Red spruce reverses the common characteristics of most trees and grows faster as it grows older. In youth it is one of the slowest growing trees we have. It remains of seedling or sapling size often for upwards of half a century, growing inconspicuously underneath the shade of other trees. Finally when they die or are cut and it receives an abundant supply of light, it

suddenly increases in growth and adds to its height and becomes a full-grown tree. From then on its growth is regular and well sustained till old age. Native spruce requires a rotation of from 80 to 100 years, and most virgin spruce cut to-day is well over the century mark in age.

The spruces make desirable ornamental trees, but the red spruce is generally too slow growing for this purpose. The most common spruce seen in cultivation in the eastern United States is the Norway—an importation from Europe.

MATURE SPRUCE STANDS IN THE ADIRONDACKS

Spruces generally grow mixed with hardwoods or other conifers, in this case with balsam fir which has formed a thick under-story. The fir is a less valuable tree than the spruces but is increasing in amount because it grows faster than the spruces and takes its place in the forest when the wood is cut.

It has been estimated that the stand of the eastern spruces in the United States is 50,000,000,000 feet, 80 per cent of it being in northern New England and northeastern New York. Although no separate estimate for the red spruce is available, it is probable that 95 per cent of it is of this species. It is peculiar that the best spruce stands are found, not in the north, but in the Appalachian Mountains, those in West Virginia taking the palm. The average stand in Maine is about 3000 or 4000 feet to the acre, and the best stands seldom exceed 15,000 or 20,000 feet, while in West Virginia they often average 6000 feet and more, with maximums of 60,000. In North Carolina yields are not quite so high, but still in excess of those in the north. The reason seems to be that the trees grow thicker on the ground and are more often found in pure stands. Most of the spruce stumpage is controlled by pulp and lumber interests.

The wood of the eastern spruces is so similar in character and appearance that it is exceedingly difficult to tell them apart. Nor is it generally important that they be distinguished from each other, since commercially they are all one. Superficially spruce wood resembles white pine, but there is no distinction between heart and sapwood and the color is apt to be even paler and more whitish. It never possesses the light reddish or rose colored cast common to the latter. Spruce wood has no desirable figure, being one of the plainest and most homogeneous of our woods. Consequently it has no place as a cabinet or ornamental wood.

Commercial Uses of Red Spruce

SPRUCE was little used till the supply of pine began to decrease, when its better grades came into the market as a substitute for the pine. Although it now has an assured place of its own as a lumber wood and even has substitutes, chiefly balsam fir, it has never been pre-eminently noted as a lumber producer—not because of any lack of value and adaptability, but because it is of more value for something else—wood pulp, seventy per cent of the cut being used for this purpose. The spruces are the leading pulpwoods of the world and red spruce the leading pulpwood of the United States. About 70 per cent of the pulpwood used in

the United States is spruce, chiefly red spruce, the remainder being made from some 6 or 8 other species.

The most desirable qualities in a pulpwood are length and toughness of fiber. Long-fibered woods mat down

PILE OF FOUR-FOOT PULPWOOD FOR TRANSPORTATION TO THE PULP-MILLS

The chief use of spruce-wood is as a source of wood-pulp for paper. Seventy per cent of the paper manufactured in America is made from spruce-wood. The industry gives employment to thousands of men both in woods and mill. It is hoped that the present extraordinary demand for pulp and consequent high prices will not induce over-cutting of pulpwoods and consequent grave reduction of the future supply.

well into paper, and make strong paper. Likewise, strength and toughness of fiber make for strength and toughness of paper. There are woods having longer fibers than spruce, but when length and toughness are combined it is one of the leaders. Another desirable quality in a pulpwood is a light color. Red gum, a dark colored wood, makes an excellent pulp, but the cost of bleaching it is said to be prohibitive. Lastly, a pulpwood must be abundant and not too valuable for other use, else the pulp man cannot compete with the lumberman for it. Spruce meets all these requirements and is worthy of its rank as a leading pulpwood. Most of it is used for the manufacture of print papers, and the larger part of our newspapers are printed on paper made from spruce pulp. For newspaper it is common to mix sulphite or "chemical" pulp with ground wood, the former having more body and the latter being cheaper.

Spruce lumber can be used acceptably as a substitute for white pine in most cases. It is chiefly used for dimension timbers of small sizes, house frames, sash door, and blind manufacture, and box shooks. Because of its light weight and moderate strength it is a very desirable wood for framework and dimension lumber of smaller sizes, and possesses some advantages for these uses over stronger but heavier woods such as southern yellow pine and oak. Its weight is but little more than half of oak and 35 per cent less than that of yellow pine. Spruce clapboards, side boards and other forms of lumber for exterior finish are also manufactured in considerable amounts, since spruce lasts well when exposed to the atmosphere. Most of the spruce lumber cut in New England, New York and the Maritime Provinces is sold along the seaboard, chiefly at Boston and New York. Much of it is shipped by water directly from mills located at tidewater in Maine and New Brunswick. A small amount also goes abroad from those localities, chiefly to Europe and the West Indies. West Virginia spruce is sold chiefly in and about Pittsburgh and Philadelphia.

Much spruce is sawed to order at the mills, dealers frequently sending in specifications as to size and length and receiving lumber all ready to be placed in building without the necessity of cutting it to length from standard sizes and wasting the trim.

Spruce has many uses aside from building purposes.

PULPWOOD ON THE BANKS OF STREAM IN NEW HAMPSHIRE

Most spruce is still cut in remote regions and driven down the streams to the pulp- or saw-mills. Four-foot spruce bolts are harder to drive than saw-logs.

It ranks high as a box wood and in the spruce region and the territory adjacent to it, which is one of the largest box making sections of the United States, spruce ranks second to white pine, which, as a box wood, is the leader for the whole country.

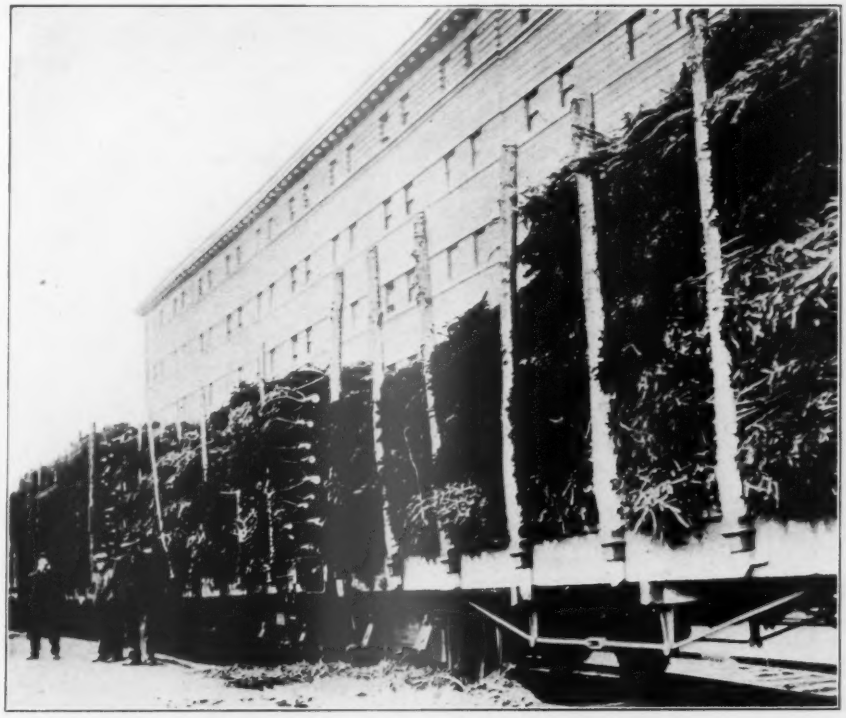
Musical instruments involving the principle of the sounding board, such as the violin and the piano, require wood of a highly resonant nature. For this spruce has no superior. The resonance of wood increases with its age, so the makers of violins take extraordinary precautions to obtain old, well-seasoned wood. Seven years is not too long for it to season for their purposes. Often they seek old beams, table tops, and other pieces which have been in service for many years, and collectors go where

old houses are being demolished in quest of such pieces.

There are hosts of uses for spruce in the various woodworking industries, all the way from ship building to the manufacture of wooden pie plates.

The use of young spruce trees along with the balsam fir for Christmas trees is well known. It was at one time thought that this business would put such a drain upon the reproduction in the forest that some of the states in the spruce region took steps to regulate it, but it seems evident now that the stock of young trees is not seriously depleted and the young trees bring more for this purpose than they would for many years if allowed to grow up for lumber or pulp.

A product of the spruce tree, better known once than now, is spruce gum. It is formed from the resinous exudations which take place at wounds and branch stubs. Formerly it was collected largely from the standing trees, but now most of it is obtained in the course of logging work from the felled trees. The gum is used in medicine as part of the ingredients of cough syrups and drops, and for chewing gum. It sells from 12½ cents to $4.00 per pound, according to the grade. The state of Maine alone produces 150 tons annually, valued at $300,000.



A TRAIN LOAD OF CHRISTMAS TREES

Every year thousands of young spruce and fir trees are cut in the North Woods and shipped all over the eastern part of the United States to gladden the hearts of young and old at Christmas-tide. The balsam fir makes a somewhat prettier Christmas tree than the spruce and has a more pleasing odor, but very few can tell the difference. It was at one time thought that the indiscriminate cutting of young trees for Christmas trees was contrary to conservation principles and destructive to the forest, but it now seems evident that without a great extension of the business the loss is immaterial. The forest owner can obtain more for young trees as Christmas trees than their value for pulpwood or lumber at a greater age.

Photograph by P. L. Bullrick.

A WOOD FOREMAN IN THE SPRUCE WOODS

The success of a lumber camp depends upon the foreman. He is generally a Scotchman or a Yankee. He must have a large amount of technical knowledge at his command (learned from experience, not from books) and be able to handle men. This picture was taken before Mackinaw coats became popular in the cities, but they have been used in the North Woods for many years.

As to the amount of its cut, spruce ranks sixth on the list of American woods, between 3 and 4 per cent of the total lumber cut of the country being spruce. In 1912 the cut was 1,238,600,000 board feet.

At one time pine land sold for more if no spruce grew on it, but to-day spruce lands in Maine and the Adirondacks are worth more than they were when they were first logged for pine, and very little spruce stumpage is for sale. The 1915 prices for pulpwood stumpage were about as follows: In New York from $3.50 to $4 per cord; in Maine from $4 to $4.50 per cord. Saw timber in New Hampshire is worth from $5.50 to $6 per thousand; in West Virginia from $4 to $5 per thousand. These prices are higher, by the way, than for the southern pines which we ordinarily consider as more valuable woods. The prices for pulpwood ready for the mill vary from section to section. In North Carolina spruce pulpwood sells for $6 per cord; in New Hampshire it averages over $9 delivered at the mills.

1862	$9.00	per M f. o. b. Boston
1870	16.00	per M f. o. b. Boston
1880	13.00	per M f. o. b. Boston
1890	13.00	per M f. o. b. Boston
1900	16.00	per M f. o. b. Boston
1904	16.00	per M f. o. b. Boston
1906	25.10	per M f. o. b. New York
1908	20.60	per M f. o. b. New York
1910	23.30	per M f. o. b. New York
1914	25.00	per M f. o. b. Boston

It is interesting to compare the prices of spruce for a series of years in order to observe the rise in value of this wood. Boston and New York are the chief spruce marketing points, and the wholesale prices quoted in the foregoing table refer to one market or the other.

A LOGGING CAMP IN THE SPRUCE REGION

The earliest camps were built of pine or spruce logs roofed with hand-split cedar shingles. Now camps are roofed with tar paper and are frequently made of hardwood logs or rough lumber. They are usually divided into three sections, a kitchen and dining-room, a bunk house and a barn. They are connected by covered passages called dingles.

The English colonists came into contact with the spruce when settlements were made along the coast of Maine. They started to cut and export timber almost immediately, and here lumbering in America as an organized industry had its origin. It was in the forests of the Saco and Androscoggin river basins that snow-logging and river driving were first developed (the earliest organized method of cutting and transporting large numbers of logs to a distant mill). It was here that the first saw mill in America was operated (at York, Maine, in 1623). Yet it was white pine rather than spruce which was sought. For more than 200 years spruce was not considered as a timber tree. As time went on loggers exhausted the pine lower down the streams and moved further and further back, the pine becoming less and less abundant and the spruce more and more. Then, when Maine and New York were struggling for the title of leading state in lumber production, and Bangor was the leading lumber mart of the world, it was suddenly discovered that the pine was gone. Maine no longer could justly call herself the Pine Tree State. So the lumbermen turned their attention to the hitherto despised spruce. It was not till 1845 that spruce was cut and marketed and it was in 1861 that spruce first topped the pine in cut at Bangor and probably in the whole State. Since then, as the saying goes, "spruce is king."

As time has gone on newer systems of logging have been introduced in other sections. The logging railroad has largely supplanted the river for transporting logs. Steam skidders, haulers, and cableways have threatened the supremacy of animals in the woods. So the old-time system of logging developed at the edge of the spruce region now seems almost primitive, yet it is still the accepted method in that region, where it has been carried to a high state of efficiency. True, improvements have been introduced, saws have displaced axes for felling and cutting up timber, horses have largely displaced cattle for hauling logs, and in some places steam log haulers mounted on sleds and caterpillar tractors have partly displaced horses. Great improvements have been made in streams to facilitate driving, dams have been erected to regulate the flow of water, rocks have been blasted out to widen and deepen difficult channels, tele-

A RED SPRUCE LOG JAM

Log driving is a hazardous business. If a few logs become caught on an obstruction in a stream the rest behind are apt to pile up and cause a jam. Formerly jams were broken by loosening the logs with cant-hooks and many lives were lost at this hazardous work. Now they are generally blown up with dynamite.

phone lines have been strung along the main branches of the streams to keep all points of the drive in touch. Tug boats have rendered unnecessary much of the old-time labor on headworks for getting logs across lakes.

The type of men, too, has changed. The original woodsmen were native Yankees, at first farmers who worked for a while in the woods in winter and for a while on the drive in spring, but they gradually gave way to the professional lumberjack who followed the woods regularly. He is as characteristic a type of our pioneer days as the cowboy—and as picturesque. Holmes Day in his "King Spruce" and some of his poems has given us graphic pictures of him in his native north woods, while Stewart Edward White has immortalized his immediate successor, the Michigan lumberjack, in his "Blazed Trail" and "The Riverman." The first foreigners in the region were French Canadians and natives of New Brunswick and Prince Edward Island—the latter derisively known as "PI'S." All were accomplished woodsmen and accepted as such. Up to 10 years ago there were few Europeans, but now the Swede and the Polander, better known in the woods as the "Squarehead" and the "Polack," have secured a firm foothold, but the river drivers are still largely Americans and Canadian French.

Early in the fall, sometimes in midsummer, the logging crews seek the woods, generally far beyond the railroads and in an otherwise uninhabited country. Cutting starts immediately unless a camp has to be built and roads constructed. The aim is to get the winter's cut finished by Christmas or the first of January, as generally the snow becomes too deep to do much after that. The logs are decked up in yards or skidways along the main roads as fast as they are cut, and when cutting ceases the roads are plowed out and iced so that the sleds will run easily. The logs are then loaded on the sleds and hauled to the landings at the edges of the streams or lakes and dumped to await the melting of the ice and the opening of the drive. The hauling off, as it is called, is the most exciting and strenuous part of the woods work. Oftentimes it is a race with the weather man, for to linger is to let the snow melt and leave the logs in the woods till the following winter. At such times all hands work twelve, sixteen, perhaps twenty hours a day, to get the logs landed "before she breaks up," and when the impossible has been accomplished and the last log is on the landing, the whole crew breaks camp amid melting snow and slush which mark the coming of spring. After a brief season in town, it is back to the woods when the drive starts. What tales have been told of the drives on the Penobscot, the Androscoggin, the Kennebec, the Connecticut and many other streams! There is scarcely a more romantic branch of all industry than log driving. Its greatest days have passed, but it will be many years before the last log goes down the West Branch and the stories of those which have will always be told.

PAPER MAKING POSSIBILITIES

OWING to the growing scarcity in Wisconsin of wood suitable for making paper pulp, the Forest Products Laboratory has just completed a study into the methods of barking, chipping, screening, and baling of chips. Laboratory tests show that certain western woods are admirably adapted for manufacture into pulp, and negotiations are now under way between paper companies in Wisconsin and western railroads with a view to securing freight rates on trainload shipments of chips to Wisconsin. It is estimated that some of these western woods can be cut into chips, which, when dried and baled, can be delivered to the mills in Wisconsin at a very small advance over the cost of chips made from local timbers. Since there is a market for more than 300,000 cords of wood annually in Wisconsin, an attempt to utilize western species appears worthy of consideration in order to hold the supply of wood for our American paper mills on American soil.

USING THE BARK OF TREES

THE Forest Products Laboratory experts, in their efforts to reduce the amount of waste in the lumber industry, have long declared that they have been able to utilize everything but the bark, just as the pork packer is said to market everything but the squeal of the hog.

Now they have even found a way to use the bark. By a new process, waste bark can be used to partially replace expensive rag stock in the manufacture of felt roofing, and is already being used commercially by mills coöperating with the laboratory experts. The bark thus used is that remaining after the extraction of the tannin for leather work, and the same waste bark has been used successfully for the making of a commercial wallpaper. Experiments now in progress indicate that the hemlock bark may be used for sheathing paper, carpet lining, bottle wrappers and deadening felt.

IN coöperation with the Post Office Department, the Pennsylvania Department of Forestry has prepared a big forest fire placard which will be placed in every post-office in Pennsylvania located in or near a forested area. An order has also been issued by the Postmaster General advising Pennsylvania post-masters that all rural mail carriers must report any forest fires they see to the nearest fire warden.

ALMOST eight million trees will be available for next spring's reforesting operations from the stock now in the Pennsylvania State Forest nurseries. This is an increase in production over last year of about thirty per cent, and is the largest number of seedlings ever grown in the nurseries. Last year private individuals planted 1,500,000 trees furnished by the Department.

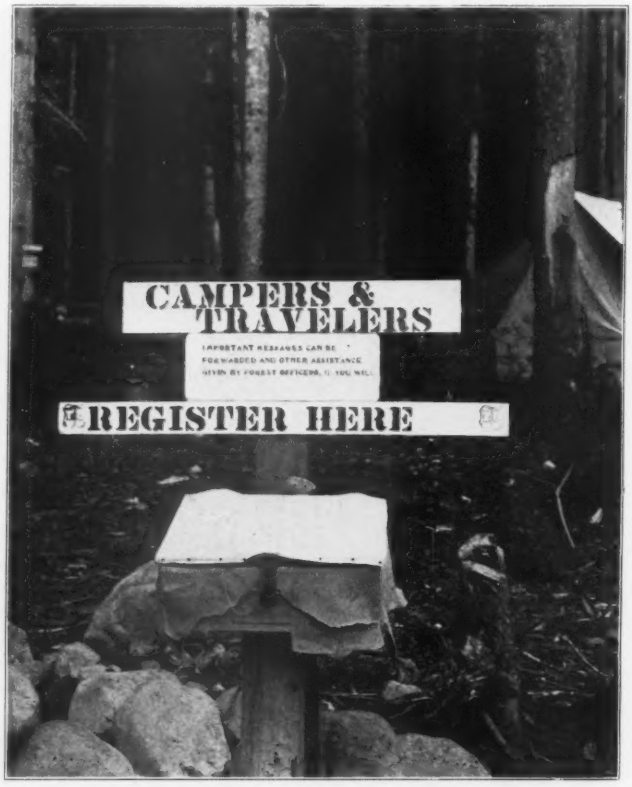
Playgrounds on National Forests

A FEW years ago most of our citizens who professed interest in the National Forests viewed the subject from a purely utilitarian standpoint. Mention a National Forest and the discussion invariably turned to questions of lumbering, grazing, and water-power. In all such questions the public's attitude was largely impersonal and usually academic. To-day the National Forests of the West occupy an entirely different position in the public mind. They have become the property of the people in a sense so genuinely personal that the Forest Service, once the most bitterly assailed Bureau of the Government, has become one of the most popular.

What is the cause of this reversal of sentiment? It is due to the fact that the Forest Service has been for years steadily converting the local public from hostility or indifference to warm support because of the many benefits realized by the public from National Forest administration. Not the least of these is the use of the National Forests for recreational purposes.

A provision in the Congressional enactments of 1915, extending the authority of the Forest Service to permit the leasing of lands suitably located within National Forests in five-acre tracts for a period of not exceeding thirty years, to individuals or associations for use as summer homes, and for the erection of hotels, stores and other structures needed for recreation or public convenience, helped the already well-developed recreational use of the forests. This development had been under way for some years, many people having built summer homes on the year-to-year permit plans. Under the 1915 law the Secretary of Agriculture has fixed a charge of from $10 to $25 a year for summer homes and somewhat higher rentals for hotels and other commercial projects.

So long as the Forest Service dealt with matters connected only with preservation and revenue, the average citizen looked upon the Forest as a region apart from his daily affairs and gave the subject but little thought. As soon, however, as the great West awakened to the fact that our National Forests are in reality personal assets, the most wonderful playgrounds in the world, open to any citizen for his use and enjoyment, the Forest Service began to grow in public esteem. The popularity of this movement is now evidenced by a widespread demand for home sites in several forests, and thousands of people, cognizant that the neighboring forest is open for their use, are flocking there for vacations. The first comers are always boosters, and as a result an enthusiastic western public is to-day encouraging and supporting the Forest Service in broadening its activities in the direction of recreational use of our vast forest areas. The summer campers and woodland rovers have heralded far and wide their delightful experiences; magazines have published pages of captivating stories about the joys of a season in the big woods, and this year the National Forests were visited by thousands who came from distant parts of the Union. It is estimated that more than 1,500,000 people visited the western National Forests this summer, or nearly five times as many as entered the National Parks. Great as were their numbers, our National Forests, with an area of 132,550,000 acres, were not crowded.



TOURISTS AND CAMPERS ARE WELCOMED TO THE NATIONAL FORESTS

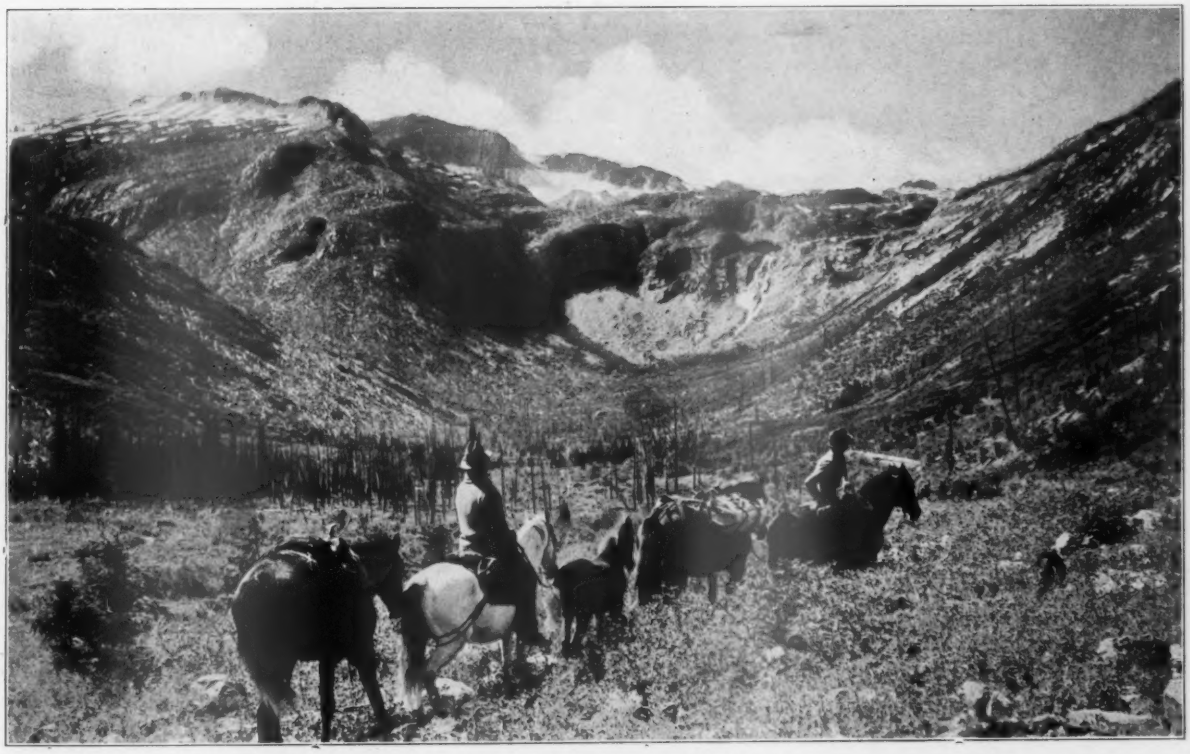
Splendid roads are being constructed to link the woods with the cities. Camp sites are located at advantageous points, with water piped from springs. The woodland trails are blazed on trees, marked plainly on maps, and the officers of the Service are constantly on the alert to render assistance to the visitor. Register and you will be looked after. There is only one "Don't" in the woods, "Don't be careless about fires."

On a summer tour, the forest visitor met and conversed with hundreds of other summer campers and tourists. In the log cabins, the rough lumber bungalows, in the tent houses and brush leantos, in moving vans and completely equipped camp autos, were to be found an enthusiastic and healthy army of city and country folk enjoying to the full the exuberant life of the clean out-of-doors in the most wonderful playground in the whole world.

In remote and unexpected places, back in the fastnesses of mountains and primeval woods they were found, whole families of them, having a wide fling with nature

THE ARROWHEAD FROM ROCKY POINT

The upper Klamath Lake in Oregon is a noted summer resort for Californians and Oregonians who have erected here many beautiful villas. On the shores of the lake, which is partly in the Crater National Forest, the Service has plotted numerous camp sites. The trout fishing here ranks with the best in the United States.



VIEW IN CHELAN COUNTY, WASHINGTON

The enthralling spectacle of snow-capped mountains, glaciers and multiple waterfalls in the Chelan country, Washington. At the head of Railway creek trail are a dozen hanging glaciers, beautiful lakes and many waterfalls, accessible for the horseback tourist. On Smoky Pass, the end of the trail, the panorama of snow-capped mountains is of indescribable beauty. The swift rushing streams are well stocked with gamy trout, and in the dense forests are many varieties of deer and bear.

in a wilderness untouched before. Toddling tots, rosy-cheeked, sturdy lads and lassies in blue jumpers and bloomers, young mothers and grandmothers, tired farmers and city men, young and old, were there, forgetful of world worries and toil-wear in the rejuvenating atmosphere of primitive nature.

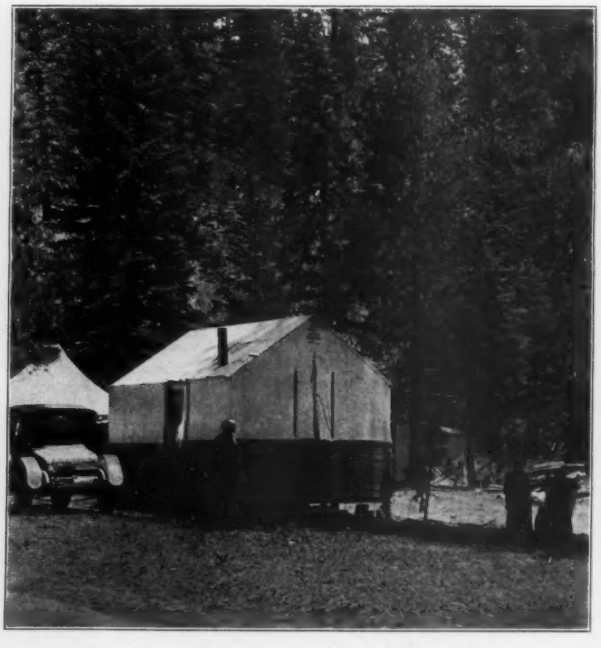
In the forests of New Mexico, Colorado, Wyoming and California were to be met citizens from many states. In a single hour the autos from eleven states passed one camp in a Colorado forest. In Wyoming a visitor rode into the Big Horn range with fifty tourists from a dozen eastern states.

The popular conception of our National Forests as inaccessible wildernesses is being rapidly dispelled. The good roads movement, so well developed in California, has spread to all the western states. The populous western centers are keenly alive to the benefits and advantages of first-class highways extending to the boundaries of our woodland playgrounds. In the forests the Service is making rapid progress in highway and trail extensions. The spirit of cooperation is rampant. States and counties are working with the Forestry engineers in linking up the principal highways with the forest thoroughfares. It is now possible to go from Denver through the Rockies over a highway which is the delight of the automobilist. In California, pathways have been made for the auto into many places of scenic beauty. Washington, with its Sunset Highway nearing completion, opens up a new pleasure-land for the tourist. Oregon, with its unrivalled boulevard along the picturesque Columbia, and Colorado, with its network of splendid roads, are attracting thousands of visitors by making accessible for conveyances of all kinds some of the most beautiful parts of our country.

A NATIONAL FOREST CAMP SITE

At many popular camp sites the Forest Service provides a big concrete stove for the camper. Eagle Creek Camp on the Columbia Highway, Oregon, is a charming camp site and is frequented by hundreds of people from Portland. A recreational park including several thousand acres of woodland has been set apart as a recreational reserve and $10,000 has been spent on new trails to open the woods for visitors. The park already has become a distinct feature in the magnificent Columbia Highway trip.

In all these activities, so far reaching in their present



TYPICAL CAMP IN PECOS NATIONAL FOREST

On the banks of the Pecos River, a beautiful mountain stream in New Mexico, hundreds of people gather in the summer in permanent villas or tents, to enjoy a vacation. The region is well mapped, with numerous trails leading into big woods or to lofty peaks where the views are inspiring.

HOME ON A NATIONAL FOREST

On the shores of Huntington Lake, in the heart of the Sierras, Californians are awake to the delights of a summer home in the woodlands. With the assistance of the Forest Service, many charming homes have been erected on leased land and every year an increasing number of families flock here from the hot cities of California's great interior valley.

LOS ANGELES MUNICIPAL PLAYGROUND IN ANGELES NATIONAL FOREST

In this sylvan retreat the progressive City of the Angels provides a two weeks' vacation for thousands of its school children. In groups of two hundred, accompanied by parents and teachers, the children are brought close to nature in her most beautiful forms. Hiking, bathing, nature studies, and other out-door pastimes are enjoyed. The entire cost per individual is only $7.50, including transportation.

LAKE CHELAN, AMERICA'S LAKE LUCERNE

This is one of the most beautiful bodies of water in the world. It is completely surrounded by lofty timbered mountains. Its shore lines are picturesque and rugged and the country all about it offers numerous and varied attractions for the camper and tourist. Under the supervision of the Forest Service, tracts are being constructed, camp sites located and a new wonderland is being opened up.

and future value to the West, the Department of Agriculture has been prominently identified. Some of the best highways approaching the Forests have been built by these engineers with funds contributed by states and counties. A new era of economy and efficiency in highway making is opening all over the West.

In the Forests, by reason of more liberal appropriation, the work of road and trail making is proceeding apace with that outside the boundaries. The best camp and villa sites are being linked by fine roads. Leading out from these, innumerable trails for the pack outfits and the mountaineers have been built to make accessible the loftier and more impressive viewpoints. Throughout the forests the trails and roads are plainly marked, telephones are conveniently located, springs, camp sites, good viewpoints, gasoline stations, stores, hotels, and practically everything a traveller should know are clearly shown on the maps or marked on the trees along the highways.

The first thought that comes to you on entering a National Forest is that you are welcome. There is but one " don't " in all the legends you read on signs and maps,—"Don't be careless about fires."

THE FIRST AUTO ON THE NEW BLEWETT PASS HIGHWAY, WASHINGTON

This splendid roadway constructed by the Forest Service connects with new state and county roads between Wenatchee and North Yakima and opens to the summer tourist a region of unusual charm and beauty, between two of the noted fruit-growing districts of the State. Blewett Pass in former days had a reputation for bad roads and heavy grades.

The ranger who greets you somewhere in the forest won't ask your pedigree or your politics. You'll look just as good to him whether you are on foot or in a limousine with the latest camp outfit, and you'll be just as welcome. The forest is a great leveller. An instance of this occurred last summer, when a careless camper with an expensive touring outfit and a sagebrusher with a span of burros and a dilapidated wagon were both brought back into the forest and there compelled to clean up their respective camps and also to put out their neglected fires.

In its effort to render the greatest amount of pleasure to the camper and summer home builder the Forest Service has given thoughtful consideration to many details. The comfort and convenience of the former is aided by furnishing camp stoves built of concrete which, by the way, also lessen the fire risk. The Forest Service has also piped water from distant springs, cleared away brush, surveyed and planted attractive sites, and at all times has rendered helpful assistance in the building of the summer homes.

While the regular duties of the ranger are onerous and trying, and the advent of an army of summer visitors brings added cares and burdens and no extra pay, the attitude of the forest man is obliging, kindly and helpful.

In California the recreational use of the forest has assumed proportions calling for the utmost tact and diplomacy on the part of the administrators. In the Angeles Forest thousands of people make use of the camp sites. So popular has this form of vacation become that the city of Los Angeles has leased a large tract of land in this forest, erected thereon thirty or more cottages, a mess hall, and a concrete bathing pool. Throughout the summer months the city arranges to transport and care for parties of pupils and teachers to the number of two hundred at a time. A two-weeks' vacation is provided for in the forest and the entire cost is about $7.50 per person, including transportation of more than 200 miles.

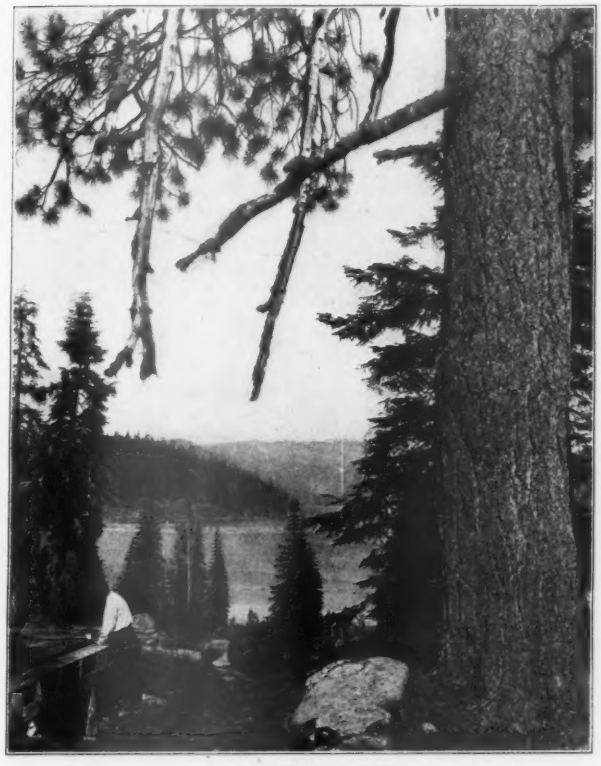
In the Sierra National Forest the Normal School of Fresno has leased a tract of land on the shores of Huntington Lake, and a summer school is held there. In the Pecos National Forest a number of Boy Scouts are given a summer vacation with lessons in forestry by a ranger as an added attraction. In the same forest a camping company has set up tent cities in various places of interest and a summer tour with frequent stops is provided. One of these, a trip to Lake Peaks, 12,000 feet elevation, is made in a single day on horseback.

The increasing demand for camp facilities in some of the forests, especially in sections where the highway systems from the cities have been completed, has brought about a new classification of certain areas. Heretofore these areas were regarded as chiefly valuable for the timber upon them, but with the clamor for camp sites the recreational use of these lands far exceeds their value for timber, and henceforth the axe will touch here no giant pine or fir so long as it can hold its head to Heaven.

In the Oregon National Forest one Sunday morning last summer there were 400 automobiles parked in and

about Eagle Creek bridge, on the Columbia Highway. This particular section, by reason of its great scenic beauty and natural advantages as a camp site, and in response to public demand, was mapped and a tract comprising 13,873 acres was set aside for recreational purposes. Ten thousand dollars is being spent on trail work and a veritable wonderland is soon to be opened.

In every forest visited the development of transportation facilities for the use of the public was going on as rapidly as the funds permitted. With the awakening of



ON HIS CHOSEN SITE

Building the summer home in the Sierra National Forest on land plotted and leased for home sites by the Service. Our National woodlands, under generous Federal policy are growing in popularity each year as summer retreats for thousands of families.

the West to the individual ownership its citizens have in the forests, with the increase in the number of permanent summer dwellings and with the growing popularity of the forest as the best health resort and playground in the world, may be confidently anticipated a more liberal policy of appropriation and a larger grant of power to the bureau which has so eminently proven its fitness for the task of administering this magnificent estate.

The economic value of the National Forests heretofore has been measured in dollars and cents. It seems not improbable that their value as playgrounds in the not distant future may be regarded even more highly.

RESOLUTIONS asking more liberal support for the Texas State Forestry Department at the hands of the next Legislature were adopted at a recent meeting of the Texas Forestry Association. Speakers estimated that $20,000 is the minimum on which the efficiency of the department can be maintained.

NEW FEDERAL GAME PRESERVE

PRESIDENT WILSON has issued a proclamation by which the Pisgah National Forest, in western North Carolina, is made a Federal game preserve. This is the first Federal game preserve of its kind to be created east of the Mississippi River. The Pisgah National Forest consists largely of the George W. Vanderbilt estate, part of which has been purchased by the Government. The land is located near Asheville and Biltmore, North Carolina. Owing to the protection against hunting which has been afforded the tract for a number of years, the game has not been killed out, as is the case in most places in the southern mountains. Deer, wild turkey, and pheasants are said to be plentiful.

After it was known that the tract would be acquired by the Government, many of the local citizens urged that the protection to the game should be continued. The North Carolina Legislature passed an act whereby the State consented to the enactment by Congress of laws for the protection of game, birds and fish on any lands purchased by the Government under the Weeks Law in the western part of the State.

As a game preserve, no hunting will be allowed on the Forest and as the deer and other game increase on the area, it is expected that the overflow will drift out of the Forest and gradually restock adjacent lands. A movement is now on foot to place a herd of elk and one of buffalo in the preserve this winter.

Regulations governing the camping and fishing privileges have been drawn up in coöperation with local citizens and sporting clubs, and will be issued by the Secretary of Agriculture. It is understood that regulated fishing will be allowed, but the number of permits issued the first season will be purely experimental, since the capacity of the streams is not known.

CALIFORNIA'S PROBLEMS

THE twenty-eight million acres of forest in California bristles with problems for investigation, and the University of California has now completed the organization of a new department of forestry in order to try to help solve them. Nobody knows yet how fast California trees grow. The division of forestry wants to find out, so that the state, counties, towns and railroad, lumber and water and power companies can devise wise policies for growing permanent crops of timber on the vast acreage unsuited for other purposes.

The university also wants to train specialists in tropical forestry to solve the problems of the vast forests of Central and South America and the orient storehouses of untouched wealth.

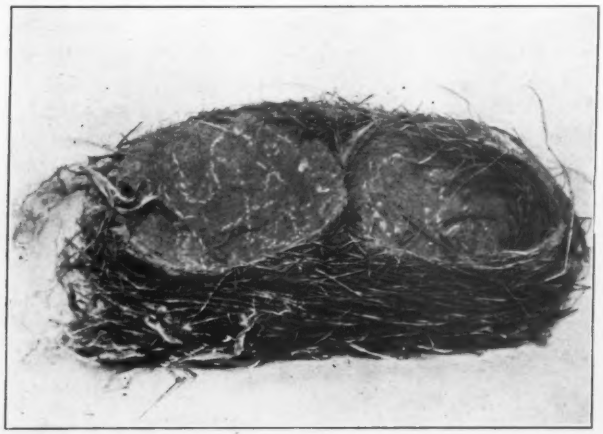
A STRIP of almost solid forest, approximately fifty-five miles long and from two to eight miles wide, has been covered by topographers of the Pennsylvania Forest Service in the most accurate survey of Pennsylvania's forests ever made. The purpose of the surveys is to secure data on which to base plans for the future development of the State Forests.

Some Problems With Everyday Birds

A Department for the Instruction and Information of Members of the American Forestry Association Regarding Birds and the Conservation of Bird Life

By A. A. Allen, Ph.D.

As the years go by and the number of ornithologists and people interested in birds and bird life is continually increasing, investigations are carried further and further afield, until the most remote and inaccessible corners of the globe are being searched for new birds and new facts about those already known. But the world is not large enough for all to be travellers and explorers and there are many who must be content to stay at home and interest themselves in the problems of every-



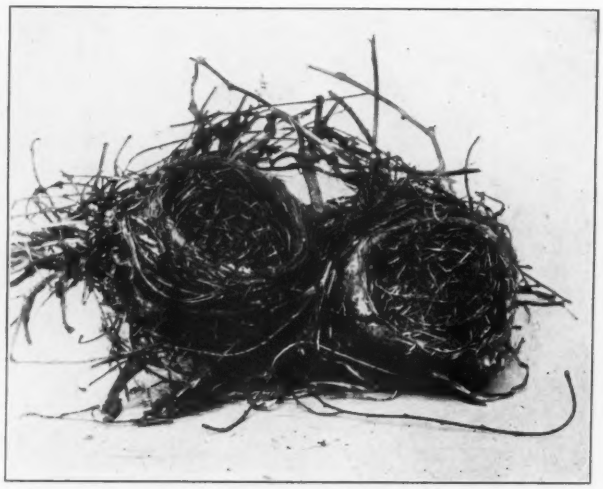
A TWO-FAMILY ROBIN'S NEST

How the modern apartment house idea is adopted by birds—although the condition is so unusual as to arouse particular interest and many surmises as to the cause, one of which is that the father of the family is a polygamist.

day birds. Many questions have lain unanswered for generations, others are continually arising, so that the stay-at-home ornithologist should never be at a loss for something to do. Some of the problems bear directly on the birds' relations to man and are of great economic importance; others are valuable in our search for truth or interesting in the parallel which they make to our own lives. All of them give new zest to the study of birds and disclose how much goes unseen and how little of what we do see, we understand. They teach us to observe more carefully and to reason logically.

Perhaps no field of ornithology offers greater opportunity for discovery than that of the home life of birds, and certainly no field is more delightfully full of surprises. One has a reason to feel, for example, that everything that can be learned about robins has already been discovered and published. Here, however, is an incident which will bear further study.

A few years ago there was brought to the author a double robin's nest shown in the accompanying photograph. It was not discovered until after the birds had left, so that nothing was known of its history. A glance at its structure, however, would convince anyone that the two compartments were built at the same time and that both had been occupied. The author was at a loss to account for it and therefore when this spring his attention was called to a similar pair of nests that were still occupied, interest was redoubled. The two nests had a common foundation over the post of a front porch and adjoined each other closely although the rims were distinct. The nests were not discovered until after both were completed and the eggs laid, so that nothing is known of how they were built. At this time, however, a bright-colored bird, presumed to be a male, was sitting on three eggs in one nest and a dull-colored bird, presumed to be a female, was incubating three in the other. As the author had to leave



THE SECOND BIRD APARTMENT HOUSE

The history of this double nest shows that three robins had shares in it, although the ornithologists are not able to satisfactorily explain the reason for this departure from their usual habit.

by an early train, further observations were made by the discoverer of the nest, Miss Mabel Carey.

The day following, another egg appeared in the "female's" nest and two days later, the eggs in the "male's" nest hatched, showing that there must have been an interval of nearly two weeks between the laying of the two sets of eggs and probably, therefore, between the building of the two nests. With the hatching of the "male's" eggs, the "female" showed considerable interest in the young birds and helped to feed them several times during the day, although she spent most of the time on her own nest. Now, however, a third robin appeared, bright in color like the first "male" and helped feed the young but did not stop to brood. Neither of the two "males" showed much interest in the "female's" nest until four days later, when "male" number one was seen to incubate

the eggs for a short time when the " female " was in search of food. The second " male " continued to help feed the young and often came when both of the other birds were present, the first " male " usually leaving upon his arrival but sometimes merely backing up and permitting him to feed.

Thirteen days later all four eggs in the second nest hatched and the other young were almost ready to leave, crowding over on to the second nest until the " female " had difficulty in getting upon it to brood the newly hatched young. The next day the " male's " young flew to the ground, while the " female " continued to brood until the middle of the afternoon. She did not, however, feed them and before evening deserted them to help feed the fledglings with the result that the next day all were dead.

Now what is the explanation of the double nest? What were the relations of the three birds and why did the " female " desert her young? The greatest difficulty arises because the sexes of the different birds could not be determined accurately. The two brightly colored birds have been called " males," but it is known that mature

A "DUMMY" NEST

This was built and is owned by the long-billed marsh wren. These wrens are architectural plutocrats because they build several nests in which they never live. Why they do it has never been satisfactorily explained.

females may be as bright as males and one or the other might have been a female. We have, therefore, two alternatives.

Assuming that both of the bright birds were males, we would have a case of polyandry, but it is difficult to understand how two males could live amicably together, or why the second male should help the first in the care of the young. It is too far removed from bird or animal nature as we know it. When polyandry does occur, there is usually no spirit of coöperation between the different males. It is much easier to think of one of the bright birds being a female and the case as one of polygamy. It is known that polygamy does occur among birds, but nevertheless, it is difficult to explain why two females should nest so close together. It is unfortunate that the birds were not observed when selecting the site, so that it might be known whether both worked together, or whether the duller, more immature bird came later and merely annexed herself. This sort of polygamy occurs with the red-winged blackbirds when the later-migrating, immature females, which have difficulty finding mates, submit to the driving of a male already mated and are content to settle somewhere within the area defended by him, usually within five or ten feet of the nest of his first mate. It might be well to explain here that mating with most birds consists of the acceptance by the female of

A BELIEVER IN MORMONISM

Here is a house wren that had two mates at the same time and fathered four broods of young and seemed to be proud of it.

the nesting area selected by the male and the power of the male to keep other males out of this area. It is furthermore known that most birds return each spring to their former nesting sites and that the females reaccept their former mates provided they are still able to drive off all other males. Now it is possible that both of these female robins may previously have nested for one brood or another on this porch and, coming back together this spring, may both have accepted the one male capable of driving away all others.

A reason for the desertion of her newly hatched young by the second female lies in the fact that a bird's instinct to feed and protect fledglings is much more powerful than its instinct to care for newly hatched young, a fact that bird photographers must always bear in mind, especially when working with wary, sensitive birds in which the

instinct of fear is strong. Birds that are impossible subjects while incubating or brooding newly hatched young are nearly fearless as the young leave the nest. The yellow-breasted chat is a good example. It has proven a stumbling block to photographers for twenty years, because all of its instincts are subservient to that of fear or caution. It will desert its nests and even its young upon the slightest provocation, so that it is practically

A SOCIAL VISIT

This family of rough-winged swallows is entertaining a visitor with whom they appear to be on most cordial terms. The writer wonders if this is the beginning of a social instinct among birds.

impossible to secure a photograph of it. When the young are leaving the nest, however, the instinct to feed and protect them reaches its highest point, nearly balancing the bird's fear, so that during the past summer it was possible, with the exercise of sufficient caution, to secure some photographs of the male bird feeding the young. In the case of the robin, then, the flight of the young from the first nest aroused in the second female the more powerful instinct and she deserted the newly hatched young to care for the fledglings, even though they were not her own.

Observation of unusual cases such as this one of the robin is often suggestive of the origin of inexplicable habits among some species of birds. For example, many members of the wren family, including both species of marsh wrens, the house wren, the winter wren and at least three species of South American wrens and probably others, build duplicate nests. These have been variously called "cock nests," "dummy nests," etc., but they have never been satisfactorily explained. The house wren, for example, fills every hole and every nesting box in the vicinity with sticks before commencing the actual nest that is to be used. The marsh wrens build six or seven nests within a short radius, only one of which is used. The winter wren does the same, although, because of the nature of its nesting site, the various nests are farther apart. In each case the nest building does not cease with the completion of the real nest but continues throughout the season and it is not uncommon to find marsh wrens still building, after the middle of August, nests which will never be used. The explanation for this curious over-development of the nest-building instinct is difficult to see but careful observation of a large number of cases may shed some light upon it. The case of a pair of house wrens which built upon my porch is particularly elucidating.

The male bird, as usual, appeared first in the spring and immediately began filling all of the nesting boxes in the vicinity with sticks. Other males that appeared were promptly driven off. After a few days a female appeared and remodelled and completed the nest which the male had started in the box on the porch, the male helping her at intervals but also continuing to carry sticks into other boxes. By the time the complement of seven eggs was completed, we discovered another pair of wrens nesting over a neighbor's door, but soon afterwards observed that the two males were never singing at the

CAN YOU SEE HIM?

A song sparrow on its nest, well hidden from prying eyes and from enemies because it is streaked like the grasses which it inhabits and seems a part of them.

same time and began to suspect that something was wrong. At this time our male got caught in a sparrow trap and we placed an aluminum band on his leg to mark him. Identification was now comparatively simple and we easily followed the bird from one nest to the other. It was obviously a case of polygamy. An even stranger part of the story follows:

Thirteen days after the laying of the last egg, we looked into the box in the morning and found the young hatching. Two days later, when we came home at noon, we found the male bird throwing hair and feathers out of the nest and every young had disappeared. It was evident that the young had preceded the feathers and that the father of the family was on the rampage. We hastened to the neighbor's nest expecting to find another

scene of devastation, but were happily disappointed. Here, too, the eggs had hatched, but the young were still unharmed. In fact, while we were still there, the male came from our nest and began singing in the nearby tree with all his previous exuberance. Nor did he disturb this nest at all, but helped to feed the young until in due time they left the nest.

But what became of our female? Four days passed before she reappeared and when she did do so, it was with a feather in her bill, and she set to work to rebuild the nest that the male had ruined. The male had continued to sing in the vicinity as though nothing had happened and when she reappeared he mated with her as before. Six more eggs were laid and these did not hatch until the young had left the other nest. This was apparently more satisfactory to the male for, although up to this time he had been assisting the other female to feed her young, he now became very attentive to our young and assisted them through to maturity. In the meantime, the other female got her young started in life, came back,

ALSO OF THE SPARROW FAMILY

The chipping sparrow has departed somewhat from the type color pattern, having lost the streaks that once marked its underparts.

renovated her nest and with the help of the male started another brood. Thus the male fathered four broods, one of which he did away with, apparently because he could not care for two broods at the same time.

How general polygamy is among wrens has not yet been recorded, for it takes unusual conditions to determine it accurately. But the fact that they are so at all suggests a good explanation for the duplicate nests. These duplicate nests are built entirely or nearly so by the male birds and very probably to attract the females as a sort of a mating performance. The fact that the males continue to build after having secured one mate, and the fact that the habit is so prevalent throughout the family suggest that polygamy was one of the fixed habits of the wren progenitors and that duplicate nest building and occasional polygamy are the vestiges of this ancient habit.

Another interesting problem that concerns the home life of birds is that of the gregarious nesters like the night herons and the bank swallows. Why this habit should have developed with certain species and not with others will always invite thought and theory. That the presence of others of the same species nesting in the near vicinity is irritating to most birds is a familiar fact. Usually one pair, when nesting, will not permit the close approach of any other bird, especially one of the same species. Social nesters, like the bank swallows, are the exception.

The rough-winged swallows are particularly solitary

THE EVENING GROSBEAK

This bird is an unusual member of the sparrow family. He is marked differently from the typical sparrows, being bright yellow, black and white.

in their nesting habits as compared with the bank swallows. They nest in old kingfisher burrows, drain pipes or crevices in the cliffs and though two or three pairs may build in the same vicinity, they are never truly gregarious or social and resent the approach of other individuals near their nests. While working with a pair that were nesting in an old kingfisher burrow, I noticed two other swallows which were nesting at a considerable distance occasionally flying past or even hovering for a minute before the entrance to my birds' burrow. Usually they were promptly set upon and driven away. Gradually I became aware, however, that both birds of the other pair were not being treated alike. One was always, without exception, attacked by both my birds and driven away, while the other passed to and fro without molestation. When I removed the young from the nest and perched them on a wire fence to photograph them, the second pair of swallows appeared and, as usual, one of them was promptly driven away but the other was allowed to remain. In fact, this swallow caught a passing damsel fly and actually fed it to one of the young as though it

were its parent. The accompanying photograph shows all three birds perched on the fence with the young just after the fourth bird had been driven away.

Now how shall we interpret this strange preference which the swallows were showing for one of their kind? Are we to think that the pair of swallows had formed some sort of an attachment for the third bird like a human friendship? Was it a symptom of polygamy, or can we read in it the origin of the social instinct in other swallows by the overcoming of the natural antipathy to another bird of the same species? It is not sufficient in explaining the origin of a social instinct in birds to state that they have come together for protection or on account of restricted nesting sites because a far larger number of species suffer from these restrictions or need of protection than actually avail themselves of the opportunity of nesting together. They have first to overcome that natural antipathy toward one another, especially during the nesting season, which has been so necessary for the dispersal of the species and for maintaining a sufficient food supply. The bank swallows have overcome it entirely, whether through polygamy or what not, we do not yet know. Possibly the rough-winged swallows are coming to it. Certainly it offers a fascinating field for study and experiment to one located near a colony of social birds.

These are but a few of the numerous observations which anyone might make and which help to make the study of ornithology most fascinating. The hundreds of little points in a bird's home life, in its migrations, in its feeding habits or in its coloration that are at present without explanation will eventually yield their secret to careful observers. Which discoveries may prove of great value to mankind and which will only add to the treasury of knowledge, the discoverer may never know and the world may never recognize, but just as surely as anyone interests himself sufficiently and trains himself to observe conscientiously, just so will he learn new secrets and reveal new truths about our every-day birds.

The Sparrows

(Family Fringillidæ)

THE sparrows, finches and buntings constitute the largest family of birds, including over 1200 species and subspecies. They are found all over the world except in Australia, but are most abundant in the Northern Hemisphere. In North America, north of Mexico, 91 species have been recorded and in Eastern United States 45 species are to be found.

By most ornithologists the sparrows are considered the highest development of bird life. They are generalized in their structures rather than specialized, and in this age they are the dominant birds of the world. Geologically speaking, this might well be called the "Age of Sparrows," just as in the past we have had an Age of Divers, an Age of Waders, an Age of Woodpeckers, etc. The strong conical bills of the sparrows, although thus modified for crushing seeds, are at the same time sharply pointed to enable them to pick up the smallest insects. They are correspondingly versatile in their feeding habits, so that while in fall and winter they feed almost entirely upon seeds, during the summer they consume great quantities of insects. They are, therefore, among our most valuable birds both for their consumption of weed seed and for their destruction of insect pests.

YOUNG CHIPPING SPARROWS
These youngsters show the streaks which their father and mother and all their adult relations have lost. The bird in the middle is a young cowbird.

The typical sparrows are rather dull-colored brown and gray birds, usually heavy streaked, so that they resemble the pattern of the grasses among which they live, for the majority of them are terrestrial birds, feeding and nesting on or near the ground. The family includes, however, the grosbeaks and buntings, many of which are brilliantly colored, and the line separating the sparrow family from that most brilliant family of all, the tanagers, is nowhere very sharp.

Many species of this family, especially exotic ones, have beautiful songs, and are best known as cage birds, the canary and bullfinch being familiar examples. Our native sparrows and grosbeaks are second only to the thrushes in their musical ability.

Sparrows build well-formed nests of straws and grasses, lined with finer grasses and horsehair, a few species using cotton or feathers. Most of them lay bluish eggs, more or less spotted with brown. Young sparrows of all species are more streaked than the adults, and where there is a difference in color between male and female, they resemble the female. For example, young chipping sparrows have heavily streaked breasts, although this is true of neither parent, and the young of the rose-breasted grosbeak are brownish and streaked like the female bird. This shows that the original pattern of the sparrow family was one of streaks, like that of many species today, and that all the uniformly or brilliantly marked species have developed away from the main stem.

Sparrows are plastic birds and respond readily to the factors of their environment, excess of light and aridity tending to make them pale in color, and excess of humidity and shade making them darker. Thus among such widely distributed species as the song and fox sparrows that are found throughout North America, we find a remarkably pale race in the hot, arid regions of the west, while those of the Pacific Coast are very dark. The birds of Eastern North America, on the other hand, where conditions are not extreme, are intermediate.

Typical sparrows are hardy birds. Many species never migrate and others retire southward only short distances, remaining in cold latitudes throughout the winter. A few are highly migratory, the indigo bird and blue grosbeak wintering in Central America, and the rose-breasted grosbeak continuing as far as Colombia or Ecuador. Among the familiar winter birds of Northern United States might be mentioned the tree sparrow, snow bunting, longspurs, redpolls, pine and evening grosbeaks, pine siskin, and crossbills. These birds nest in the far north and come southward only far enough to find food. Some that remain throughout the year, or migrate only short distances, include the goldfinch, purple finch, song sparrow, junco and the ubiquitous house sparrow. Others that are more migratory, and spend the winter in southern United States, include white-throated, white-crowned, vesper, chipping, field and fox sparrows, and towhee.

LIKE FATHER? OR MOTHER?

When the male bird is brighter in color than the female the young resembles the female. Here is a male rose-breasted grosbeak feeding its young.

All of these birds are easily attracted to feeding stations during the migration or during the winter, if a plentiful supply of seeds is afforded. The cracked grain sold for small chicks, with an admixture of sunflower seeds, is most satisfactory. Feeding the birds in winter is a delightful and instructive pastime and a real help to trees and gardens. Directions for maintaining a feeding station at or near one's window will be found in AMERICAN FORESTRY for December, 1915.

PULPWOOD STATISTICS INCLUDED

FIGURES showing the amount of wood used in the United States for making pulp will, it is announced, be obtained by the Forest Service in connection with its 1916 census of the lumber industry. Because of the increasing scarcity of the pulpwood in some parts of the country, the need for accurate figures showing the consumption of this class of material is realized by manufacturers and foresters alike and it is expected that such figures will be made a part of the yearly statistical work of the Forest Service. The pulp manufacturers will coöperate in the work, through their trade organization, the Newsprint Manufacturers' Association.

Detailed information in regard to the amount and cost of different kinds of pulpwood consumed in the different states is to be collected. Comparative figures showing the total pulpwood consumption of the country for 1899, 1909, 1914, and 1916 are to be compiled.

The data to be obtained will, it is stated, be of considerable value to pulp manufacturers, as well as to the Forest Service. Owing to the comparatively small number of pulp mills in the United States, it is thought it will be possible to issue a report on the work at an early date.

NEW YORK TO BUY FORESTS

AT the recent election the people of New York State voted to tax themselves $10,000,000 for the purchase of forest preserves. The fact that this was not done by act of legislature, but by a referendum, shows how popular the idea of state forests has become with the people at large. The forest preserves of New York are not only of great economic importance for the preservation of the water supply and of local industries, but serve as an immense park which is visited annually by millions of people. Of the total amount voted, $7,500,000 will be available for further purchases in the Adirondacks and Catskills, where the State owns already 1,814,550 acres of forests and lakes, and $2,500,000 for the Highlands of the Hudson Preserve. A private subscription of a like sum had already been secured contingent on the passage of this proposition of the referendum. There will, therefore, be available altogether $5,000,000 for the completion of a great interstate park in the Highlands of the Hudson.

This splendid example set by a wealthy state will undoubtedly have a valuable influence on other eastern states. The fourteen thousand acres which the Vermont Forestry Department has acquired is a good start in the right direction, but it is only a drop in the bucket compared to the 3,000,000 acres of woodland in the State.

Rocky Mountain National Park

By Mark Daniels

Former Superintendent of National Parks

THERE are many who consider the name "Rocky Mountain National Park" as nothing short of an inspiration, and I know that any criticism of this title of one of our national playgrounds will make the hair on the æsthetic necks of those who had much to do with the naming of this Park bristle with antagonism. Not that the name has much to do with the Park, for, after all, what's in a name? And if those who named a lake "Round Lake" because it was round, "Red Peak," because it was red, and "Gray Peak," because it was almost gray, have continued to draw their inspiration from the same inexhaustible source, who should criticise them for naming the Rocky Mountain National Park as they did, because it is in the Rocky Mountains? Such consistency deserves compliment rather than criticism. Nevertheless it would seem that something more specific than the particular cognomen selected might have been introduced which would indicate either that this National Park did not extend from the Gulf of Mexico to the Canadian border or that it was located where it was for some specific purpose. Mount Rainier National Park is definitely indicated by its name; Glacier National Park is more or less described by its name, and so with Mesa Verde, Sequoia and most of the others. They might have called it "The Rocky Mountain-Colorado-Sixty-Miles-from-Denver-National Park" without, in the minds of many, having detracted materially from the euphony of the name selected.

I have heard the arguments in favor of this name and they are many. For example, it is contended that the mind of the sweating husbandmen of the sultry east, whose thoughts at eve turn from heating labors to the long coveted trip to the cool and snowy heights, lights automatically and without mental effort upon the magic phrase "Rocky Mountains." What more logical, therefore, than a Rocky Mountain National Park? But can it not also be said that while we are thus saving the tired business man the labor of taking down his geography to determine where the particular national park he may read of is located, we are, by this very saving of effort, failing to broaden his knowledge of

ESTES PARK VILLAGE, ESTES PARK, COLORADO

This village nestles at the base of the Continental Divide in one of the most beautiful valleys in the Rocky Mountains. The picture does not seem to bear out the statement in the Government bulletin to the effect that it is beautiful, despite the fact that the Stanley Hotel has done a great deal to lift the village out of the class of tawdriness.

the country he lives in. I have also heard that while this name has not the musical value of Sequoia, Yosemite and Rainier, there is no doubt that there is in the phrase "Rocky Mountain National Park" a certain hardness and roughness which, when the phrase is once fixed in the memory, prevents it from slipping out too easily. To all these arguments I can only say that it is sincere love for this beautiful area that suggests the advisability of selecting for it the best name possible, and if this has been done, there is nothing more to be said. Whether the name that it shall forever be known by is beautiful or not, there is no doubt that "Rocky Mountain National Park" contains some of the most wonderful scenery we have in this country.

There is no scenic reservation in our system of National Parks which is so well located to serve the people as the Rocky Mountain National Park. It is but fifteen miles or so from Fort Collins, which is the terminal of a branch line of the Union Pacific system, and may be reached in cars of the Union Pacific Railroad Company's standard service. It is about sixty miles from Denver, whence it can be approached by motor over some of the finest roads in the State of Colorado. It is in the eastern portion of the Rocky Mountains and is, therefore, about the first location of high elevations that can be reached by the westward exodus from the hot valleys of the Mississippi and the Missouri. A thirty-six hour ride from Chicago will land one practically at the toes of the Park. This means that a very large percentage of the population of the United States has at last a national park, embracing glaciers, sparkling lakes and lofty peaks, within thirty-six hours' train ride from their own homes. In addition to this, when the tourist is landed at Fort Collins on the Union Pacific, he is not dropped like a lost soul in the wilderness, but steps from the train on to the platform of a modern and well-kept-up depot, back of which lies a town that is bidding strongly for the reputation of being spotless.

Photograph by Wiswall Brothers, Denver.

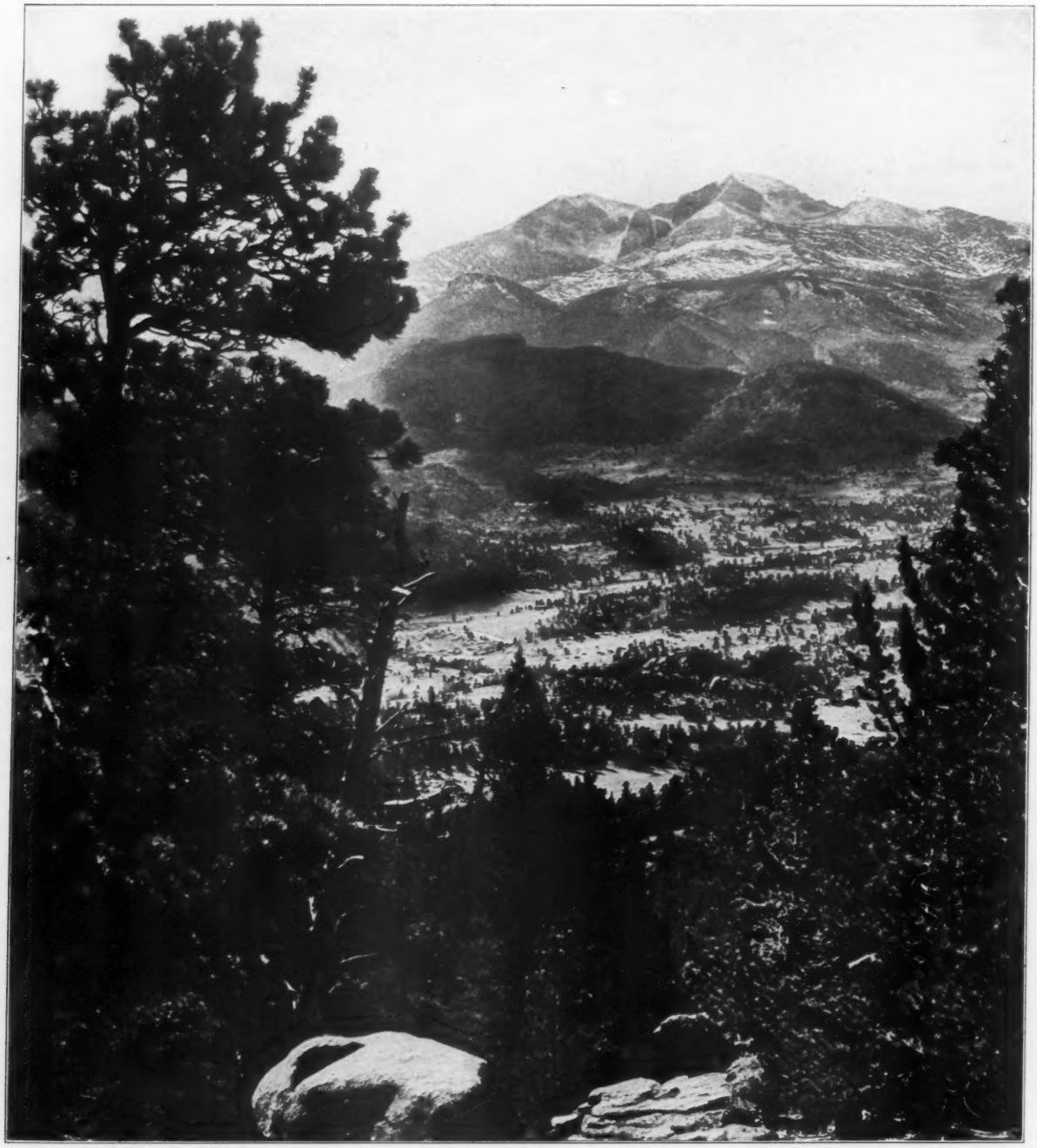
ROCK CLIFFS, BIG THOMPSON ROAD TO ESTES PARK

One approach to the Rocky Mountain National Park is up the canyon of the Big Thompson. The road, for many miles, skirts the very edge of the roaring, rushing waters of the river, clinging meanwhile at the base of the great cliffs. It is one of the most beautiful drives to be found in this country.

Fort Collins is a picturesque, attractive and interesting town and one that is well calculated to place the tourist in that frame of mind which precludes quibbling over such minor inconveniences as dusty roads, springless wagons and federal politics, the last of which seems to be, like the poor of Christ's parable, ever with us in Colorado. Why federal politics should pick on a state whose residents must make scenery at least the dessert of their daily nourishment is rather difficult to conceive, unless it is that this State on the top of our continent presents temptations as a site for junketing parties. Or perhaps it is that an architect of talent and ability once conceived, at the instigation of Mr. William Randolph Hearst, a summer home for the President, situated on the precipitous peaks surrounding Denver, and through the broad medium of the instigator's publications instilled into the minds of federal politicians a scheme by which they could justify trips to the Rocky Mountains. In any case, the fact remains that if you visit the Rocky Mountain National Park, you must mind your P's and Q's and be careful to carry with you certificates of political faith testifying that you belong to any and all parties. Not only must this be done, but the possibility of springing one certificate on the wrong party must be carefully avoided.

As an example of the influence of the Colorado vote, the first attempt to appoint a superintendent of the Park is an excellent example. Acting on the instructions of the Secretary of the Interior, a department official was interviewing likely candidates in a room, the door to which would not close. Having found, perhaps, the best man for the position that could be secured in that part of the country, he shook hands with his selection and stepped with him to the door. As he opened the door, a press reporter removed his ear from the opening just in time to save his head from coming into violent contact with a material that gave strong evidence of having supplied many similar heads. The next morning there were head-

lines announcing the appointments of the Secretary of the Interior to the offices in the new park, and the wires from Washington began to sing. As a result, a gentleman of culture and education who had agreed to accept a position that carried a salary materially less than his private income, was not appointed. The man who was big enough to have the job seek him was set aside, and the time-worn custom of going over the list of men seeking the job was wearily begun. However, the telegraph company made a handsome profit on the deal. Perhaps all this discussion of political conditions may seem extraneous to the subject of scenery and national parks. It is, nevertheless, in the particular instance of the Rocky Mountain National Park, of considerable value to the tourist who wishes to enjoy the scenery with the least possible annoyance.



THE PEAK OF THE ROCKIES

The summit of Long's Peak is the highest point in the Rocky Mountains. It dominates the surrounding territory and rises like a protecting power over the little village of Estes Park which nestles near its base.

The best approach to the Park is up the canyon of the Thompson River to Estes Park, a small village nestling at the base of Oldman Mountain, and surrounded on three

sides by the towering peaks of the Rockies. There are very few towns or villages in the United States that are so beautifully situated as is Estes Park, but here I must take issue with the author of that Department publication who calls the town "beautiful." The site is wonderful, and if one is inclined to place credit where it is due, he must say that God made a masterpiece of this beautiful valley; but in so far as I was personally able to ascertain through a stay of some length at Estes Park, there was nothing in the village that had been done by man that did not scream its impropriety. However, the assault upon the eyes made by the inartistic cottages and houses of Estes Park is short-lived, for no one who has ever breathed deeply of the air of mountain peaks can long withstand the call of the ridges that surround the village, and the excellent Stanley Hotel is really worth while.

There is a bit of road running from the village up the Fall River to one of the western entrances. In 1914 a small bit of this road had been graded into the Park and now there are within the Park perhaps as much as eight or nine miles of wagon road, two or three of which, horrors of extravagance, have been built by the Federal Government. If, therefore, the tourist expects to see anything of the Rocky Mountain National Park from an automobile, he is doomed to the bitterest of disappointments, but if he will ride or walk, the most beautiful part of the Park can be visited without staying away from the hotel over night.

Photograph by Wiswall Brothers, Denver.

PORTION OF ROAD BUILT BY CONVICT LABOR

The Government has built but a small bit of road in the National Park, in fact it has built practically none of the road exclusively with Federal funds, but has used what meager appropriations could be secured from the State of Colorado, and, with the aid of convict labor, has built a few miles of very excellent road. The picture here shown is a portion of the Fall River road which was built by Colorado convict labor according to the excellent survey of the State Highway Commission.

There is a trail running from Iceberg Lake, in the northern portion of the Park, along a plateau that maintains, for six or seven miles, an almost constant elevation of twelve thousand feet. From this ridge the crest of the Continental Divide is silhouetted against the western sky across a great canyon half a mile in depth. This wonderful plateau enjoys the distinctive and descriptive name of Trail Ridge, it probably having been assumed by the namers that no other ridge ever carried a trail upon its undulating bosom. Speaking of names, the Rocky Mountain National Park offers much food for thought. There are Blue Lake, Black Lake, The Loch, Green Lake and possibly, if one had time to carefully study the map, Red, Purple and Yellow Lakes might be found. These names stand out rather distinctively against such names as Ouzel Lake, Fern Lake and Shelf Lake, whose names seem to indicate something of the character they possess. Of course, the list of names in the Park, as usual, embraces a list of office holders in the Federal Government and local celebrities, who feared they might die with no other evidence of their having existed than their names upon a government contour map.

The most interesting and picturesque part of the entire Park is the area embracing about fifty square miles centered around Long's Peak. Here the Continental Divide, which rises more gradually from the western boundary of the Park, drops off precipitously, leaving great glaciated cirques, vertical cliffs and tremendously deep canyons which, from a distance, seem to defy exploration. Odessa Lake, on Fern Creek, is an exquisite gem of green and blue, which seems to be almost surrounded by the jagged crests of the Continental Divide and its spurs. Further south, clinging fairly closely to the base of the eastern slope of the Divide, are Bear Lake, The Loch, Mills and many other beautiful sheets of water cupped in the hollow of granite walls.

There is a stretch of territory to the east of the Divide, and snuggling up close beneath its towering crest, which seems to be the place in this portion of the Rocky Mountains where nature concentrated in an effort to run the entire gamut of her repertoire of scenic wonders. This area begins at a point almost due west of the village of Estes Park, and runs south about seven miles. In it there are almost every form of scenic wonders with the exception of such phenomena as are to be encountered in Yellowstone National Park. The area is dotted with lakes and meadows traversed by innumerable streams, covered with beautiful forests and boasts of an occasional glacier thrown in here and there for good measure. In a small area, consisting of not more than one township, there are somewhere in the neighborhood of forty lakes, if one is willing to apply the name "lake" to some small sheets of water not more than one hundred yards in diameter. In this same area are the Andrews Glacier and

the Taylor Glacier. On the eastern extremity of this riot of scenery is Long's Peak, the highest peak in the Rockies, at the base of which is Long's Peak Inn, after which some people will tell you the peak was named. The proprietor of both is Mr. Enos Mills, a naturalist and writer who is accredited, according to the Interior Department's circular, with being "the father of the Rocky Mountain National Park." Such a statement from the Interior Department itself raises in the minds of some a doubt as to the verity of Government publications, and suggests the possibility of another dispute over parenthood. Such arguments, however, are not unique, for on every hand may be found naturalists who disagree with the Great Creator.

Mr. Mills has lived and operated his hotel in the shadow of Long's Peak for many years, and despite the fact that he is accredited with being the father of his inn, as well as other things, the hostelry itself looks much older than its owner. As a writer, it is known that he had nothing to do with the naming of the points of interest in his bailiwick, for anyone reading his delightful works would know that he would not have to resort to a list of paint colors as a source of names.

Photograph by Wiswall Brothers, Denver.

THIS INSPIRES A SUGGESTION

The National Park Service might do very well to adopt the plan of building small drinking fountains in the most frequented locations, as the Denver Mountain Parks Commission has done. Whether the National Park would be as successful in securing such attractive modern Sarahs at their wells, as the Denver park system, is open to some question.

Long's Peak Inn is about ten or twelve miles from the village of Estes Park and is excellently situated as a secondary base from which to operate in the neighborhood of this area of intensified scenery. Most tourists who are fond of mountain climbing essay the ascent of Long's Peak after having been thoroughly fortified by a rest and other things to be had at the Inn. The vertical face of Long's Peak may be seen as a terminating feature at the western end of the canyon which flattens out to accommodate Long's Peak Inn, and it beckons the mountain lover, casting about him the irresistible spell of its mightiness.

Long's Peak is the highest of a group of several peaks, the tops of which are hardly a half mile apart. On the east there is a vertical precipice of some fifteen hundred feet in height, at the base of which is Chasm Lake, a placid sheet of water in the bottom of one of the most distinctive glacial cirques in the district. Little or no foliage is visible in the neighborhood, and the entire scene is pregnant with an atmosphere of lofty silence. The ascent to the top of the Peak from the lower benches is not so simple as it seems, but can be safely negotiated if the spirit of foolhardiness does not overcome the climber. The trail to the top approaches the Peak from the north and east, threading en route the little canyon of Alpine Brook, crossing over a plateau called Boulder Field, and striking a northward reaching spur of the main ridge about half a mile to the north of the Peak.

There is quite a distinction between not only the formation, but also the color of the peaks in the Rocky Mountains and in the higher Sierra of California. The Rocky Mountains are more colorful, and to him whose eye is not so sensitive to the delicate shades of lavender and warm grays, the deeper colors of the Rockies present more attractions. Nor is there the same degree of terrifying wildness about the peaks of the Great Divide that is to be found in the high Sierra. Nevertheless, it is safe to say that to one who is reaching a height in excess of fourteen thousand feet for the first time, there will be sufficient in the panorama from the top of Long's Peak to recall his past wrongdoings with a suddenness that begets a determination to follow the paths of righteousness in the future. In the vicinity of Long's Peak there is a comparatively small area of that same precipitous storm-torn clutter of jagged peaks that may be found in the high Sierra stretching from Mount Langley nearly to Lake Tahoe, but the scope of nature's activities in sculpturing mighty peaks and chasms seems to have been, in the Rockies, limited to certain areas.

In considering the beauties of the Rocky Mountain National Park, the flora of the district should not be overlooked. As is known to many, the columbine is the floral emblem of the State of Colorado, and it thrives in the Rocky Mountain National Park in a profusion that is

astounding; in fact there are meadows here and there that are fairly carpeted with Indian Paint Brush, columbine and an almost inexhaustible variety of mountain wild-flowers. The general effect of a short trip through the richest portion of this scenic area leaves the impression of having passed through a kaleidoscopic range of colors that is never to be forgotten.

Almost half of the Park lies to the west of the Continental Divide, and while it is sufficiently broken in contour to disturb the complacent bosom of the effete easterner, despite the fact that his sojourn on the Atlantic Coast enables him to negotiate the approach to Brooklyn Bridge without any marked acceleration of the heart action, it is still not nearly so rugged and difficult to travel through as is the eastern portion. Nevertheless, to many, the western half has its charm of forest cover, larger lakes and flowing streams which present a more peaceful and inviting picture. After all, to leave the sights of towering sky-scrapers, deafening riveting machines and roaring traffic, where all of the forces of nature seem to be fighting one another as agents for man in his pursuit of the elusive cartwheel of commerce, and to arrive at a scene where the forces of nature, undirected by the hands of man, have been shattering granite peaks into natural sky-scrapers, is not altogether a complete change, and viewed in this light, the western half of the Park may present the more attractive picture, excluding, of course, the valleys that seem to focus in the vicinity of the village of Estes Park.

There is a road, skirting about two-thirds of the western border of the Park, which runs almost due north and south along the Kawuneeche Valley. This road leads south to the village of Granby on the Denver and Salt Lake Railroad. Its northern extremity is nowhere in particular. About two-thirds of the way down the western border of the Park, however, there is the town of Grand Lake, on the northern shores of a lake of the same name.

Despite the fact that in our Government bulletins we find Grand Lake described as "a thriving centre of hotel and cottage life," there are many who will argue that its greatest asset is the fact that the surface of the Lake is 8,369 feet above the sea and over 1,000 miles from New York. The Lake itself, while not within the legal boundaries of the Park, is still embraced on three sides by these boundaries, and is, therefore, substantially within the Park. Its surface covers approximately one square mile and constitutes perhaps one of the most charming sheets of water in this part of the State of Colorado. Its outlet is into the Grand River. It is supplied from the innumerable lakes and snow-banks of the Divide through Tonahutu Creek and, most ingenious of names, the North Outlet and East Outlet. The last two named of these creeks or streams heads in a series of really beautiful lakes in the valleys of which here and there are to be encountered the numerous groves of aspens with their birch-like bark standing out like silver shafts against the background of vivid green. Along these streams, as along most any other in the Park, there are to be found beaver dams that raise the level of the water here and there to make small hand-mirrors for the gods.

In the northern portion of the Park, which is closer to the village of Estes Park, there is the Hallet Glacier and Crystal and Lawn Lakes offering themselves upon the altar of scenic fascinations in their portion of the Park. The Black Canyon Creek and Roaring River branches of the Fall River head in Lawn Lake and present for those who love the view of moving water perhaps as interesting a side trip as can be found. There is also the Cache La Poudre River which heads in the Poudre Lakes at the crest of the Divide, but only six or seven miles of its headwaters are within the boundaries of the Park.

It is to be deeply regretted that when the Park was established, sufficient area was not enclosed within the boundary lines to include another district of scenic beauty which lies about ten miles south of the present southern Park boundary. The Continental Divide runs almost due north and south after it emerges from the southern end of the Park. Ten miles south of the Park boundary is the Arapaho Glacier, which is one of the largest glaciers in the district. Just south of the Park boundary, not more than a half mile as the crow flies, are the two St. Vrain Glaciers. The eastern slope of the Divide is dotted with lakes as plentiful in number as the district in the vicinity of Long's Peak and Hallet Peak, while the western slope is richer in scenery than is the western slope of the Divide inside the Park. As a matter of fact, the entire area from the present Park south to and including Pike's Peak, in the vicinity of Colorado Springs, should be thrown into a national park and developed to the highest possible degree for the use of the public.

This stretch of territory is almost entirely scenic in character, and while it possesses fairly large forests, is so broken in contour as to reduce materially the commercial value of the standing timber. There is a material percentage of the population of the United States that is in real and serious need of a public playground where they can forget for the time the sweltering heat of the Middle West. These people turn instinctively to the cool heights of the Rocky Mountains which are within easy striking distance. Nothing, therefore, could be more logical or more fitting than that a Federal Government, which boasts of the fact that it is operating exclusively on the *pro bono publico* theory, should take steps to develop this one of its national assets, at least to that degree which would make it available for the great population that needs it most. Whether or not those to whom votes are as precious as poverty to a pawn broker can be led to snitch a side of bacon from the pork barrel with which to grease the wheels of justice, is a question of grave doubt, but if this cannot be done, at least steps should be taken to further the present wise policy of the Secretary of Agriculture to develop the recreation resources of the National Forests. As a matter of fact, so long as the National Forests are not entirely within the boundaries of the National Parks, there are going to be those who will

wish to enjoy their outings in the National forests, and now that we have a Park Service Bureau, it would seem that the time has come when some sort of sensible co-operation should be established between that Service and the Forest Service. The latter is bound, by the sheer nature of things, to be called upon to protect tourists in their pursuit of insouciant pleasure in the wilds, no matter how many national parks we have or how well they are advertised and administered. When this fact is thoroughly recognized and a practical basis of coöperation is established, there will be a vote of thanks coming to someone from every one concerned.

Little-Known Forest Products

IN addition to the ordinary uses of wood with which we are familiar, mankind is dependent upon the forest for a variety of products whose appearance does not indicate their origin, say members of the Forest Service. Numerous as these products are, and as extensive as is their use at the present time, science is constantly learning new constituents which enter into the make-up of wood and is finding new uses to which these constituents and those already known can be put. Powder for munitions or blasting, disinfectants for protection against contagious diseases, and artificial silk for clothing are among the products obtained in whole or in part from wood.

Charcoal, as everyone knows, is essential for the manufacture of black powder. All of the acetone used as a solvent in making nitrocellulose powders is derived from acetic acid, a product of hardwood distillation. Great Britain, it is said, is dependent upon the United States for acetone used in making cordite. Black walnut is a standard for gunstocks, and has been so much in demand for the past two years that our supply of this valuable wood has been considerably reduced and other woods, notably birch, are being substituted. From Europe comes the complaint that there is a shortage of willow for making wooden legs.

Pure wood alcohol is the only substance which can be converted commercially into formaldehyde, which is universally used for disinfection against such contagious diseases as smallpox, scarlet fever, and tuberculosis. The experts at the Forest Products Laboratory have conducted extensive experiments on the production of grain or ethyl alcohol from wood and have been successful in experimental work in raising the yield and lowering the cost of production. If this process can be put on a commercial basis, the foresters say, it will result in putting the millions of tons of coniferous sawdust and other material which is now wasted every year to a profitable use.

By converting cellulose, one of the elements of wood, into a gelatinous material, known as viscose, a wide field is opened up for the utilization of wood waste, and a new line of products, varying all the way from sausage casings to tapestry, is added to the already lengthy list. Many of the so-called "silk" socks, neckties and fancy braids now on the market contain artificial silk made from wood.

About nine-tenths of all the paper which we use is made from wood. Besides the detailed investigations of the methods of making newsprint paper, and of the production of paper from woods hitherto unused for that purpose, which have been conducted, kraft paper, which compares favorably with the best on the market, has been produced experimentally at the Forest Products Laboratory from longleaf-pine mill-waste. This kraft paper is brown in color and is very much stronger than ordinary papers. It is used for a variety of purposes, and, cut into strips, is spun or twisted into thread which is then woven into onion and coffee bags, matting, suitcases and wall covering, similar to burlap, and furniture closely resembling that made from reeds, as well as other articles of common use.

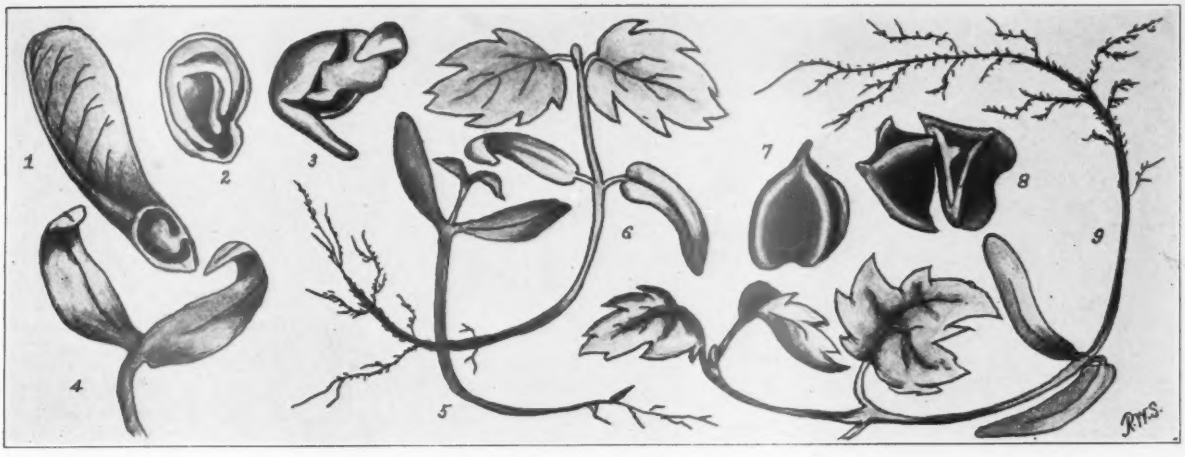
Within the past year the Forest Products Laboratory has, by coöperating with manufacturers, succeeded in getting a dye made from mill waste of osage orange put on the market as a substitute for fustic, which we import from Jamaica and Tehuantepec.

These are only a few examples of the various lines of work carried on at the Forest Products Laboratory, say the men in charge. Other activities, ranging all the way from the study of decay in wood to that of the resistance of wood to fire, are in progress, and new discoveries are constantly being made. Incidentally, the Forest Laboratory, at Madison, Wisconsin, was the first of its kind in the world and is probably still the best equipped. With the possible exception of Germany, no other country has done as much as the United States systematically to investigate the possibilities of its forest resources.

AS a result of recommendations of the Secretary of Agriculture, based upon approved classification reports submitted by the Forest Service, 19,840 acres of land have been eliminated from the Routt National Forest in northwestern Colorado by a Presidential proclamation. This action is in accordance with the policy of putting all lands in the National Forests to the use to which they are best suited.

THIRTY-SEVENTH ANNUAL MEETING

The 37th annual meeting of the American Forestry Association will be held at Washington, D. C., on Thursday and Friday, January 18 and 19, 1917. All members are urged to attend.



THE GERMINATING PLANTLET

1. One wing of maple seed, opened lengthwise to show position of seed in its pod. 2. Maple seed enlarged, showing the forming of the very earliest stage in the coming plantlet. 3. Another enlarged seed, with the coming plant further along. 4. The first pair of leaves after the plantlet comes above the ground. These first leaves in *all* plants are called *cotyledons*. 5. Shows the initial stemlet extending beyond the cotyledons, and the first minute leaflets developing. 6. The same plant later on, and 9, where the *second pair* of leaflets develop at *right angles* to the first pair. 7. Seed of beach tree, about natural size. 8. The same, bisected horizontally to show the earliest stage of the germinating tree.

Studying Plants in Winter

By R. W. Shufeldt, M.D.

Editor of the Department of Flowers

BEFORE touching upon the subject to be dealt with here, the very interesting and important one of studying our flowering trees and plants during the winter months, I desire to invite attention to the head-piece and its legend, which appears at the beginning of the article. This has been entitled "The Germinating Plantlet," and is the first of a series of such cuts, of which one will be thus introduced each month. One of the most difficult things for the young or amateur botanist to master are the terms employed in botanical works in the descriptions given wild flowers. This list of terms, or nomenclature of flowers and plants, is a very formidable one, and one that has discouraged many a grown person as well as young people from seriously entering upon the study of wild flowers or taking up botany at all. This is a great pity, and it will be my aim during the months following to overcome, as far as possible, this difficulty.

When a sage of yore remarked that there is "no royal road to knowledge," I am convinced he must have had the study of wild flowers in mind; for surely botany as a science absolutely bristles with an almost endless terminology, for which there are but very few common English names, or, as we term them, vernacular names. A good example of this is seen in the cut at the head of this article, in No. 4, where I figure the *cotyledons* (coty-le-dons) of a germinating plant. There is no common name for this pair of cotyledons, and it is impossible for one to write and talk about germinating plants unless the term is used. And so it is all through the study of wild flowers. I feel sure that the way I have selected to help the reader to master the common terms in botany will be accomplished as above pointed out. The plan will tell with ever-increasing usefulness as month after month this *illustrated glossary* will appear. For example, next month this head-piece may present the parts of a flower—an average flower—and the names of those parts. This may be followed another month with figures and names of the principal type-forms of the leaves of wild flowers, or maybe the terminology of the different kinds of roots that wild flowers have, and so on. My hope is that this scheme will be found very useful and helpful to teachers, and to others who may use the articles in classes of young people and others taking up the study of wild flowers.

There is a great deal to learn about plants, trees, and shrubs, in addition to the mere florescence or the *blooming* of flowers, but this matter will not be taken up here at the present time; it will be gradually introduced as various articles appear.

In that enormous strip of country constituting the northern part of the United States, south to an east and west line, forming the southern boundary, north of which the winters are sufficiently cold to check all plant and tree growth entirely, the sap running down in

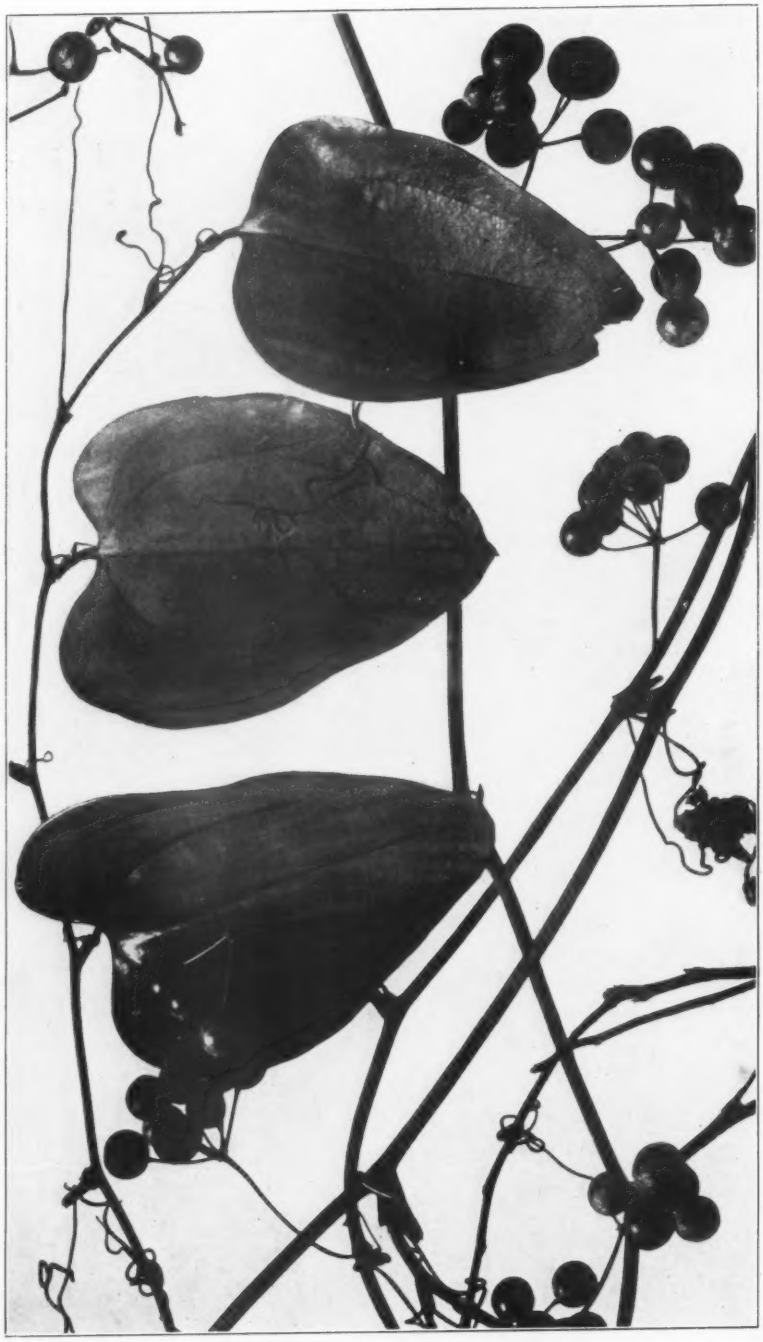
ASK YOUR QUESTIONS

THE editor of this department will gladly answer questions of any member of the American Forestry Association regarding wild or cultivated flowers and there will be no charge for the answers.

Write the questions plainly and address them to

EDITOR, DEPT. OF FLOWERS,
American Forestry Association,
Washington, D. C.

the latter, and nearly all the former dying down to the ground. In this great area we have no wild flowers out-of-doors to study; but, on the other hand, when we go botanizing afield, we meet with no end of other material in this line for our consideration, and samples of all I have in mind of this should be carefully collected and taken home for study during the long winter evenings, when all the plants in the great open are asleep. Special attention should be devoted to the various ways in which the plants "go to seed," and their seeds and seed receptacles should receive our particular attention. Several illustrations of this will be dwelt upon in the present contribution, and there is, in part, no better example of what is to be brought out on this subject than what is seen in our "Common Green Brier" or *Smilax*. This plant is not only known and at once recognized by us, but it also is, in the parts of the country where it flourishes, likewise familiar to nearly every boy and girl. They know its shiny leaves well, and it is often called the "Bread and Butter Vine." Children have a habit of chewing the leaves when these first come out in the spring, and we all know of the strong, wiry nature of the vine, and the many sharp thorns it possesses, which so often impede our progress as we have occasion to go quickly through the woods, or anywhere where this troublesome vine grows at all luxuriantly. Its beautiful little *greenish* flowers appear quite early in the spring, and are pretty well-known to good observers; next spring I trust to make them still better known. With the berries and seeds it is quite different, for comparatively few people go into the woods and fields when the berries are ripe, and when the leaves have fallen from this vine, leaving only the berries in evidence and the thorns. It is at this stage that the growth is quite unknown to many—a fact I have convinced myself of through actual interrogation.



THE COMMON GREEN BRIER

FIG. 1.—This very well represents a specimen as it appears when its seeds are first matured. It is the *Smilax rotundifolia* of the genus *Smilax*, which belongs to the Lily family or *Liliaceæ*. It ranges from Nova-Scotia to Georgia, westward to Minnesota, and southward to Texas. It is subject to marked variation, but generally occurs in moist thickets. Scattered thorns or prickles arm its 4-angular branchlets, especially in *western* examples.

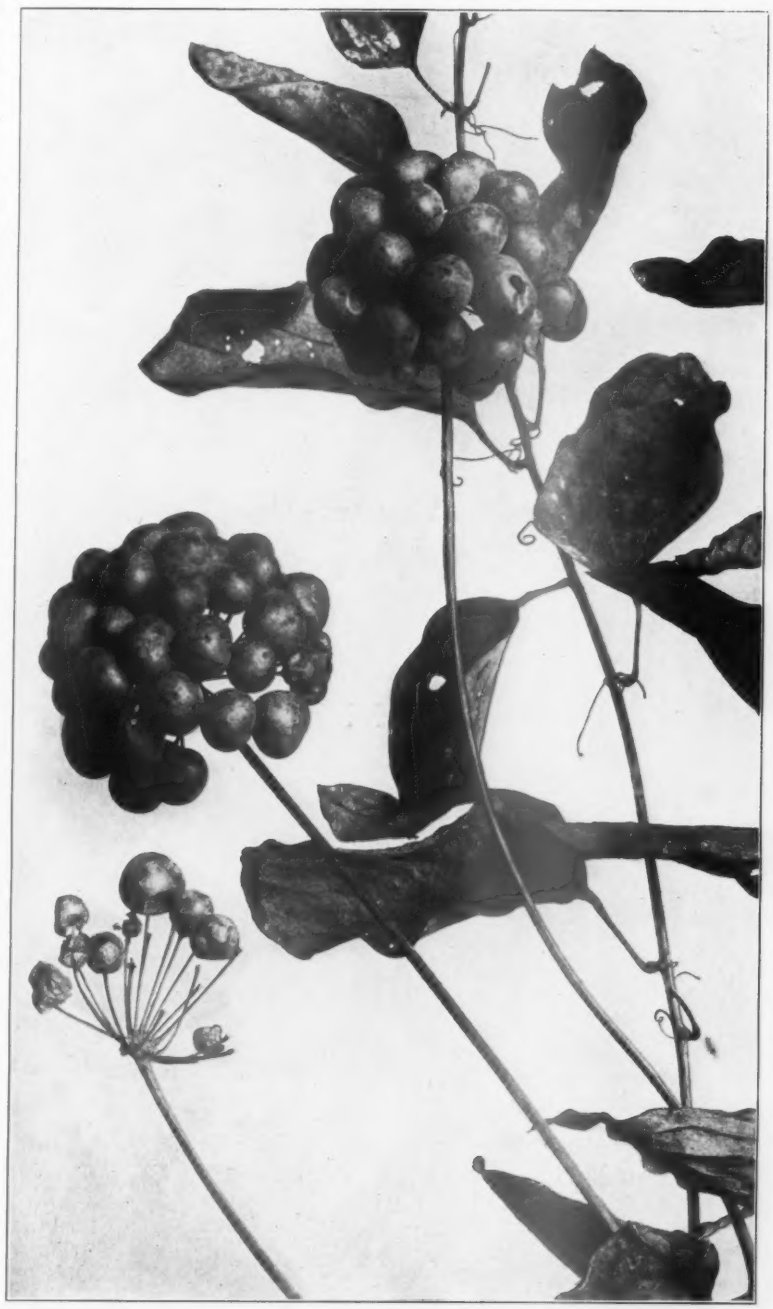
Now the Smilax family is a more extensive one than is commonly supposed; for as the *Smilaceæ*, as the botanists give it to us, we find that no fewer than eleven species of this vine are described, with at least two varieties of two of the species. They are generally arrayed in two groups, and for our purpose here only a good representative of each group will be referred to. The common green brier, or horse brier, mentioned above is shown in Figure 1, while the one known under the not very attractive name of "Carrion Flower" is shown in Figure 2. Both of these were collected near Washington, D. C., late in October. Sometimes, as you go into the fields, or along the edge of the woods, you can recognize the common green brier as far as you can see it; for, as in the case of all vines of this group

its leaves turn in the fall to most beautiful shades of red, scarlet, and various tints of yellow, all the way from a rich orange to a pale lemon yellow. Certain highly colored spots break out upon these leaves, which still further tend to enhance their beauty. This exquisite turning of the leaves is common to all the different kinds of Smilax vines, and it is invariably offset by the marked beauty of the elegant little bunches of berries they bear at this season (Figs. 1 and 2). Each berry is borne upon a delicate little stalk, the entire bunch being generally a roundish cluster; this is well shown in Figure 2. They always remind me of a small edition of Concord grapes, as they possess the same bluish-black color, with a decided "bloom" spread over each berry.

In the common green brier the leaves are ovate or roundish, many of them being truly heart-shaped, though the botanists have called this vine *Smilax rotundifolia,* referring to its roundish leaves, while the carrion flower is known as *Smilax herbacea.* Of the latter Miss Alice Lounsberry, in her charming little work "A Guide to the Wild Flowers," says: "In the season of its bloom the odour of this plant serves to identify it with one of its common names. As the flowers fall, however, it becomes less obnoxious, and is one of the first to foretell by its rich, changing colouring the approach of the autumn. Its near relative, *Smilax rotundifolia,* is not so partial to moist soil, and is well known along the roadsides and fields."

The stem of this vine is smooth, and has not the "prickles" of the common green brier. Both are erect and climbing. I am thus particular with the two chosen species of these two groups, for I desire to record enough here to help one to be absolutely sure of the difference when they are met with in nature. This great principle holds in our studies in every department of natural science, and it was continually brought before the classes in botany at Cornell University, where not only I but hundreds of other students had this principle instilled into our minds through the teachings of that great master of the science, Dr. David Starr Jordan, who at that time was a tutor there in that branch of nature work. "Compare, gentlemen, compare; for comparison is the key to a natural classification," he would say; and I may add that the classification of flowers is in no way different from any other kind of classification, as that of watches, cameras, or pistols. It but brings *things* into an orderly and natural arrangement, in that the knowledge thus acquired may be duly stored away in the mind for future use.

There is another vine which we meet with everywhere in the woods at this season, and long do its leaves remain



BERRIES OF THE CARRION FLOWER

FIG. 2.—This is another *Smilax* (see Fig. 1) found in the wet lands and on the banks of rivers and small streams. Ranges from New Brunswick and Manitoba to Texas. Exhibits great variability. Easily recognized by the unpleasant odor of its flowers in the spring. This is *Smilax herbacea.*

green and fast to the great masses of stems—wildly running stems—that bear them. I refer to the Japanese Honeysuckle (*Lonicera japonica*). Next summer I will give a beautiful photograph of this vine, but right here I desire to show that it, too, bears *black, shiny* berries in the fall (most honeysuckles bear red or orange berries); but see how different these berries are from the ones borne on the Smilax vine. They have not the "bloom" upon them, nor are they borne upon the extremities of little stemlets. This is a good thing to know; and, as I say, we will take up this favorite flower again, for it is worthy of a much fuller description, with a few lines on its place in the flower-system in nature. I must be in a *spring mood* in order to describe honeysuckles, for they stand among the most beautiful flowers that embellish the roadsides and woods at that season.

THE HONEYSUCKLE FAMILY

FIG. 3.—This is designated as the *Caprifoliaceæ*, a small group of interesting vines, often bearing very fragrant flowers. The specimen here shown is of the Japanese honeysuckle (*Lonicera japonica*); it will be noticed that its berries are *black* and not red or yellow, which is the case with our American Woodbines or honeysuckles. The Japanese honeysuckle was introduced into this country from Asia, and it is now extremely abundant from New England to Florida, especially along highways and byways. It is *the* honeysuckle of the roadside. The fragrant flowers are white, pink, or yellow.

In some of the old pastures in the winter-time, when the dead vegetation is all covered with the untrodden and glistening snow, one may see, in scattered groups and ranging in height from a yard to five or six feet, such curious-appearing growths as the ones I show in Figure 4. These are called "Gypsy Combs" and a good many other fancy names, while they really are the dried and dead heads of the wild or common Card Teazel (*Dipsacus sylvestris*). They are given natural size in the figure; and were we to follow their stems down, it would be seen that they branch in two and twos from a common point on the main stem; here, too, a pair of the narrow, lancehead leaves are found. In the spring the tiny purple or lilac flowers are densely packed in between these hard, stiff-pointed structures that form the cylindrical heads shown in my photograph. This Teazel represents the *Dipsacaceæ* or Teazel family, and there are not many representatives of it in this country, although three genera have been created to contain them.

There are nearly *sixty* different kinds of Goldenrod in the flora of the United States, all being contained in the genus *Solidago*. The common forms are well known to any observer of flowers in nature. Next summer I shall touch upon the most prominent species of this group, while in the present article I show how a Goldenrod appears when it goes to seed in the autumn; there are two species shown in the cut.

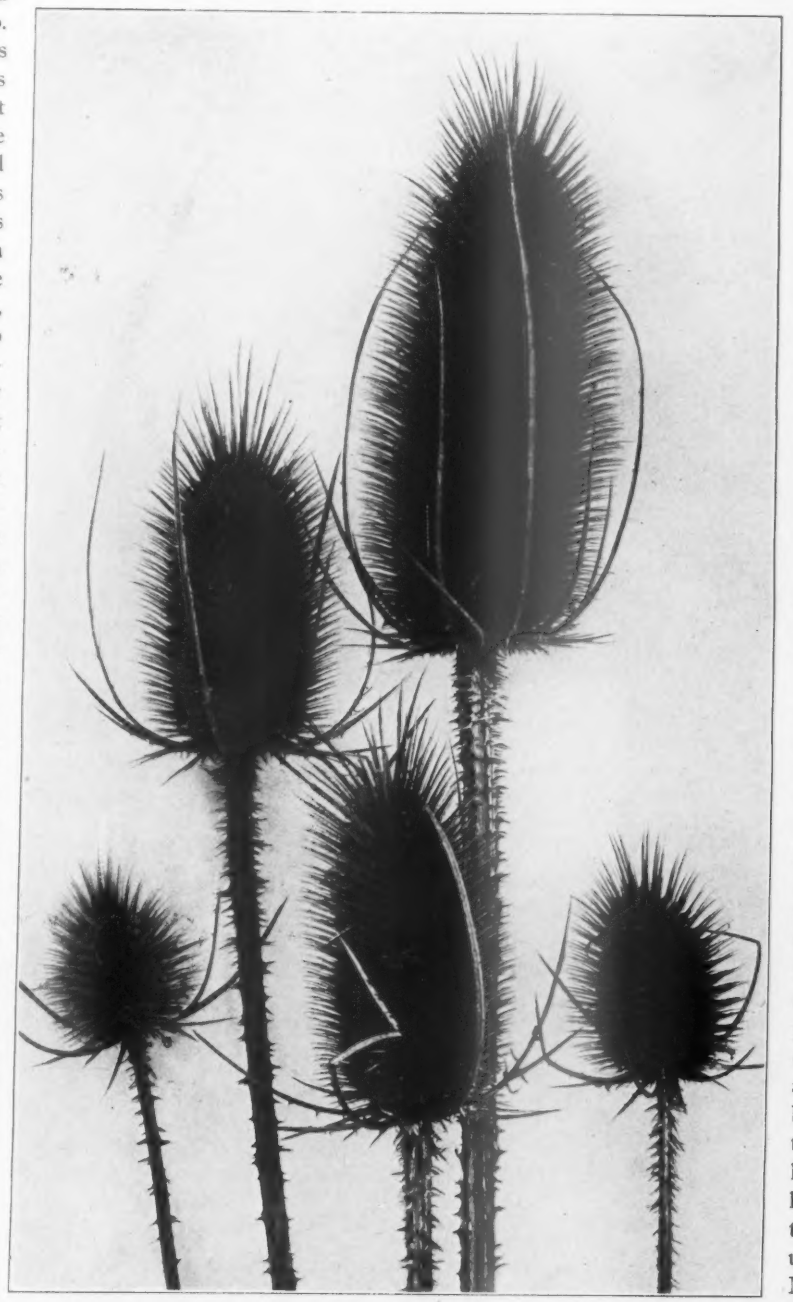
It will be noticed that in the one the locust is resting upon, the separate stems bearing the flowers do not run up into a point, but are nearly all in the same plane at their upper ends. Sometimes this variety is found in full flower when it is no more than a foot high, while I have seen specimens of it that had grown to be about four feet high. Scientifically,

this Goldenrod was formerly known as *Solidago lanceolata;* but it has now been removed to the genus *Euthamia* of Nuttall, and in the last edition of Gray's Botany it stands as *Euthamia grammifolia.* (p. 797.) One of its principal characters is the fact that it is *flat-topped;* the ends of the several flower bunches composing its plume are, as a whole, in the same plane superiorly, and not brought up in a conical fashion, as in so many other species. It has several common names, as the Lance-leaved Goldenrod, and the Bushy or Fragrant Goldenrod. Another character by which it may be identified in this most puzzling assemblage of plants, is that its leaves are lance-shaped; the form they assume is well shown in Figure 5 of the present article, where, too, it is seen that their edges are smooth and even, or not toothed. In color they are a light green, with from three to five ribs running the whole length of them.

The terminology for leaf-description will be given pretty soon in one of my articles, when it will be much easier to comprehend the meaning of the terms commonly used by botanists everywhere in order to describe these very important structures in the vegetable world.

Throughout the Middle Atlantic States this Lance-leaved Goldenrod flourishes from July to September, being found principally along river and creek banks, along roadsides, and, in some instances, growing so luxuriantly as to almost entirely fill an extensive low meadow, extending, perhaps, from stream to stream.

The Goldenrod standing next to this, on the right hand side of the picture (Fig. 5), is a specimen of the Yellow-weed or Canada Goldenrod (*Solidago canadensis*). This is probably the most abundant of all in this elegant assemblage of flowers, and it is found from British Columbia and eastward, and southward to include the Floridan peninsula. It is a tall, stoutish plant, with a leaf that, when typical, is quite unmistakable; they are pointed at both ends, rough above and rather woody below, with saw-toothed edges. This latter character is, however, absent in the leaves highest up on the stems. Note that in the Canada Goldenrod the flower-bunches are so arranged that they, as a whole, form a pointed pyramid with the summit above. Finally I may say of the leaves that they are



THESE HAVE A DECIDEDLY PRACTICAL VALUE

FIG. 4.—The Teazel family (*Dipsacaceæ*) is a very small group in this country, including but three genera and a few species. We see here the "combs" of the common, wild card teazel (*Dipsacus sylvestris*), an interesting and important plant in not a few particulars. It is *rare* in the United States and therefore is not used commercially. In the western parts of England the teazel heads are used in the manufacture of woolen cloths of various kinds, that is, they are used to "raise the nap," and they answer this purpose far better than any tool that man has as yet been able to make. Metal ones tear the material, whereas a card teazel head, such as we see in this illustration, when seriously obstructed during the nap-raising process, breaks, and, as I say, thus saves the fabric from being torn. They were brought by the ton into England before the war from France and Germany, and there is no reason why these card teazels should not be raised for the same purpose in the United States, where woolen goods are so largely manufactured. They use them by simply scraping the thorny stem to make a handle, and then the natural tool is ready for use. Cattle will not browse upon this plant, as often even the upper surface of the leaves is covered with prickles that would tear the tongue of a browsing animal. The bases of the upper leaves grow together, and in the pocket thus formed the rain and dew collect. Country people will tell you that this is a "sure cure" for warts. It is a good place to collect small insects, these Venus's Cups or Basins. Indeed, there is much more to be said about the head of a card teazel, for which there is not sufficient room here.

a dull olive green; and if you look sharp, you will see that each leaf is triple-veined, or triple nerved. That is, there are three veins, as they are called, to the leaf, and they run from point to point on each, or, as we may say, from the stem extremity to the distal apex. Usually, the flower-heads are not very large, and the tiny flowers composing them may be said to be of rather a greenish yellow color; on the whole they are of a spreading type, as may be seen in the illustration.

Do you ask me which I take to be the most beautiful, the daintiest, and the most attractive of all this great host of Goldenrods that our country is favored with? My choice is easily made; and I feel quite sure that those who are at all familiar with these plants will readily agree with me: it is the graceful little *Solidago cæsia*, the Blue-stemmed or Wreath Goldenrod, also called the Woodland Goldenrod. Later on, I will present here a reproduction of a photograph of this artistic little species, and you will be able to note that, unlike most of its family, it does not head up like the average members of the group. The flowers are in limited, oblong clusters, situated at, or rather springing from, the insertions of the leaf-stems, or where the leaf-stems spring from the main plant-stem. The latter are usually arched for their continuity, and of a distinctly bluish or purplish hue—hence one of its common names, the Blue-stemmed Goldenrod.

This Wreath Goldenrod is quite abundant in some regions, and is usually found on shady banks, or along edges of shady woods. Often I have found it growing at the sides of paths that run through the woods, where its bright yellow flowers and arching, bluish stem are sure to attract attention.

THE GOLDENRODS

FIG. 5.—One of the most difficult families of all the flowers to study and identify are the Goldenrods or the *Solidago* group. Two species gone to seed are shown in this reproduction of one of my photographs. Some of the species may grow to be eight feet in height, with gorgeous golden plumes surmounting the top. There are several groups of Goldenrods, including over eighty species of plants. They will be taken up more in detail next year when the plants are in flower. Specimens should be pressed and sent in from all parts of the country for identification. The insect shown in the cut is the American locust (*Schistocerca americana*), often injurious in the South.

But this is all we can say about our Goldenrods just at present—and, as stated above, they will be taken up again in some later issue of AMERICAN FORESTRY.

Before closing the present article, however, it will be as well to say a word in reference to what may be touched upon along other lines, as we pass more extensively into this subject of the study of our wild flowers. Already I have been interrogated as to the best field or handbooks the student should have in order to extend the information to be given in the present department. One or two of these have been mentioned and quoted from in this and a previous article here, and later on it may be that other works will be cited; requests should especially come in to that end. No one can study systematically, much less advantageously, our wild flowers unless by the aid of one or more authoritative text-books on the subject.

Such books may be strictly scientific, as the last edition of Gray, to which reference has already been made; or they may be partly scientific and partly popular, and we will find a number of these in our libraries.

In purchasing books of this latter class, one should be certain that the author has not sacrificed accuracy to insure a popular handling of the subject; for it is better to have a limited knowledge of a thing so long as it is *accurate,* than to store one's mind with a great mass of undigested, unclassified, and unreliable stuff, which can be of no use to its possessor, and only reflect discredit upon one, when one chances to use it in the presence of those who command a better knowledge of the subject, founded on fact and bearing the trade-mark of truth. Patient study in the field and in the work-room, with the aid of the last editions of authoritative text-books, will insure this knowledge, and the student will have the satisfaction of knowing that progress is being made along substantial lines of inquiry and research.

Great confusion often follows on the use of terms and on the real meaning of those terms. This danger is well seen in the *naming of colors;* in the description of forms or shapes; in the estimation of proportions, and in determining lengths and heights. Of recent years, great progress has been made in the matter of having a uniform system for the naming of colors in science, be the department what it may. This has chiefly been brought about through the work published by Prof. Robert Ridgway, curator of the Division of Birds, of the U. S. National Museum. Professor Ridgway gave his untiring attention to this subject for many years, finally publishing his admirable treatise on the "Nomenclature of Colors," in which we find plate after plate of schemes consisting of little parallelograms of color-tints, with names for every possible shade occurring in nature. Although this was primarily compiled for ornithologists, the world did not allow it to rest there very long; the book is used all the way from a silk factory to descriptive literature in every line of human activity, where the uniform naming of colors becomes necessary. Such a work is particularly useful in botany, where color means so much, and is referred to so often. For example, were I to describe a flower as being simply yellow, what kind of impression would I convey, when we have some thirty or forty different shades of yellow? Yellows, as in the case of any other color, run all the way from white to black, with the faintest possible shade of yellow at either end of the sequence. But if we aim to name the *exact shade* of yellow meant, all we have to do is to take the part of the flower, be it petal or autumn leaf, and match it with the yellows of the manual above referred to; then use the name of the discovered shade or tint for the shade of the actual flower or leaf in our spoken and written descriptions.

RECORD FOR RAPID GROWTH

By D. T. Mason

Professor of Forestry, University of California

WHILE the senior class of the Division of Forestry of the University of California was doing field work in the famous Del Monte Forest during the past summer, a very rapid growing Monterey pine (*Pinus radiata*) was discovered. This pine is the most rapid growing conifer which the writer has seen. The tree had been killed by insects presumably and cut for cordwood. A section about ten feet above the ground showed the following diameters the inside bark attained at the end of various ten-year periods:

10 years	15.0 inches
20 years	34.1 inches
30 years	46.5 inches
40 years	51.2 inches
46 years, total age	52.4 inches

In addition, the bark would add approximately three inches to the diameter of the tree at this point. The tree at breast height was about 58 inches in diameter. Its height was about 100 feet. It contained approximately 750 cubic feet of wood and bark, or about 8⅓ cords of wood.

As shown in the illustration the rings are very wide; during the period of most rapid growth some of them are over 1.5 inches in width; thus in some years the tree grew more than three inches in diameter. The Monterey pine is a short-lived, rapid-growing species which occurs in forests only within four or five miles of the ocean on and in the vicinity of the Monterey peninsula, about 125 miles south of San Francisco. The soil on which this particular tree grew is deep sand. While the rainfall averages only about 18 inches annually, the large amount of atmospheric moisture, mainly in the form of fog, together with a very long mild growing season, encourages rapid tree growth.

A QUICK GROWER

This tree gained a diameter of nearly four and a half feet in the forty-six years of its life. In some years the growth was as much as three inches.

The Ancient "Cedars of Lebanon"

By Guy E. Mitchell

THE great Cedars of Lebanon are among the most interesting living records of the past. The grove which is standing to-day is the remnant of the same forest from which the cedars were cut and hewn for the building of the Temple at Jerusalem by Solomon. There

BRANCH AND CONES OF ONE TREE

Still hardy, vigorous and fruitful, these old cedars of Lebanon continue to thrive although most of them are now, it is estimated, over 2000 years old. This branch and cones were taken from one of the oldest.

are many references to the Cedars of Lebanon in the Old Testament, the most notable in First Kings, where it is stated that through the coöperation of Hiram, the King of Tyre, Solomon brought great rafts of cedar from Lebanon to Joppa and carried them up the steep mountain-sides to Jerusalem for the first temple. In the building of the second temple, under Ezra and Nehemiah, the timbers were procured from the same cedar forest on the slopes of Mount Lebanon. At an earlier period the Psalmist refers to the Cedars as the ornament of Lebanon and one of the great glories of God's creative power and wisdom. Pliny, the Greek naturalist, named the species *Cedrus magna*, meaning "great."

The impressive thing about this ancient grove of cedars is the knowledge that the oldest and largest of them were undoubtedly living at the time when the timbers of their immediate predecessors supported the Temple. They are upwards of 2000 years old, not so old as the great Sequoias of our Pacific Coast, but still very ancient. At present there are only about 400 trees left, all very large and old. The best preserved are about 100 feet high and one has a circumference of 47 feet. The grove is now protected by a well-built, high stone wall; but all the balance of the great cedar forest of Lebanon has succumbed to the greed of man, and the grove stands like an oasis in the desert.

GIANT CEDAR OF LEBANON

The largest cedar in the grove of the cedars which furnished timber for Solomon's Temple at Jerusalem. There are now only about 400 trees left, all large and old. The best preserved are about 100 feet high and have a circumference of 47 feet.

In considering the otherwise absolute destruction of the forest over the entire mountain-side, one cannot help but wonder why this group has been preserved. A probable explanation is found in the name of the stream at the foot of the mountain—the Kadisha—which rises in the moraine left by the great glacier which swept down from the summit of Lebanon and on which the Cedars of Lebanon throve during early Biblical times. This word is the

Hebrew for "holy," and the grove has undoubtedly been preserved because of its sacred character. The natives to-day will tell you that the grove is sacred because it "was planted by Jesus Christ,"—a belief which finds the semblance of justification from a poetical passage in the 104th Psalm referring to "the Cedars of Lebanon which the Lord has planted."

As the traveler stands on the summit of Lebanon, nearly 10,000 feet high, and looks down upon this ancient grove, the remnant of a mighty forest, and upon the still more ancient glacial moraine upon which it grew, and sees upon the flank of Lebanon the ruins of ancient temples and the vast expanse of the Mediterranean beyond, and to the east the distant ruins of Syrian Baalbek, he may recall the force of the words of Holy Writ, "all flesh is grass and as the flower of the field it perisheth." Over this expanse, witnessed by these trees and their immediate predecessors, have come and gone all the great nations of antiquity. Here are the relics of the Assyrian, the Babylonian, the Egyptian, the Phœnician, the Greek, the Roman, the Moslem, but yesterday, as it seems, the Crusader, and now the warring Turk and Slav. And each has done, and perhaps to-day is doing, his part to destroy the mountains' noble covering of forest and to add to the desolation wrought by his predecessor. Could the process but be reversed, and the greed of man restrained and protection be given to the reforesting of the region, the Cedars of Lebanon might again become, as in the days of the Psalmist, the glory of the mountains.

Another Imported Tree Disease

ANOTHER of the several imported tree diseases, and one recently discovered in this country, is described by Dr. George C. Hedgcock, of the Office of Forest Pathology in the Bureau of Plant Industry, in the current number of *Mycologia*. Doctor Hedgcock states that the poplars of this country are threatened by a dangerous fungous disease which has evidently been imported from Europe. This is the European poplar-canker, a disease which attacks the twigs, limbs, and trunks of the black and Lombardy poplars (*Populus nigra*) and of the Carolina poplars or cottonwoods (*Populus deltoides*), and may be expected to attack other species of poplars and cottonwoods in regions not yet investigated.

This disease is caused by the fungus *Dothichiza populea*. It occurs first in the form of cankers or depressed dead areas in the bark much in the same manner as in case of the blight of chestnut trees, which is, however, caused by a distinctly different fungus. The effect of the fungus on poplar and cottonwood trees is as follows: cankers are formed at the point of attack, spread rapidly and often girdle the twig, limb, or trunk at the point of attack, killing the part above the canker. Trees attacked on the trunk become "spike topped." The death of limbs and twigs gives the trees a ragged appearance, which spoils their beauty, and later kills them. This is especially the case with black poplars which are frequently planted in rows along boulevards and avenues.

The European poplar-canker is most severe in its effect on stored and transplanted nursery stock. Trees when in transit, and when heeled in the ground, or freshly transplanted in the spring, are readily attacked by the fungus and ruined within a very short period of time. This disease is spread by means of spores produced in pycnidia or fruiting bodies in the form of small pimples or pustules in the bark of the cankers. From these pustules in springtime there are exuded small, sticky, cream-colored tendrils which soon change to a tawny olive or even a walnut brown. These tendrils contain millions of spores which spread the disease in various ways.

The fungus causing European poplar-canker was first found in Troyes, France, and described in 1884. In 1905 the first serious outbreak to be noted was reported and the disease described by the French pathologist Delacroix. An outbreak of the disease in Italy was reported in 1907. This disease was first reported in America by a correspondent of the Plant Disease Survey in 1915, from Massachusetts and New Hampshire, but the causal fungus was not correctly identified. During the present year the disease was found prevalent in small areas in certain districts in the following states: New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, Delaware, Maryland, Ohio, Nebraska and New Mexico. The centers of infections appear to be in every case either certain nurseries now known to contain diseased trees, or points where poplars received from such nurseries have been planted. As this disease was not known in the United States till recently, it is evidently an imported one, and must be dealt with as such, if it is dealt with at all.

Conservationists may well pause to inquire how long the merry game of importing tree diseases is to continue. The chestnut is gone: the white pine is going: the gypsy moth continues to enlarge its territory. Is the entire importing nursery trade worth the damage it has already caused to more substantial interests?

Nominate Friends for Membership
See Blank Under Table of Contents

Explanation of the G-Trees

MR. W. R. MATTOON, of the U. S. Forest Service, who has recently spent several months studying second-growth stands in the southern pine belt of longleaf and slash pines, furnishes the following explanation regarding the peculiar G-shaped trunks of pine illustrated on page 423 of the July number of AMERICAN FORESTRY.

"It is not uncommon in second-growth longleaf pine to come across trees with a striking G-form section of the main stem. The crook usually starts at a point from 3 to 7 feet above the ground, and after more or less of a half circular sweep terminates in an upward growing stem at a point located roughly over the initial point in the basal portion of the tree trunk. The explanation lies in the death of the central terminal shoot and the subsequent effort of the tree to replace it by substituting one of its laterals or side branches.

"Because of the slow-growing, flexible character of its laterals and their characteristic nearly right-angular forking, sometimes even forming a very acute angle downward with the main stem, longleaf pine is particularly successful in developing well-rounded G-shaped substitute tree trunks. The full curving of the stem is aided by the increasing weight of the growing stem. In perpetuating itself by means of a lateral branch, slash pine (*Pinus caribæa*), formerly called Cuban pine (*Pinus heterophylla*) by the U. S. Forest Service, makes much less of a curving trunk, due undoubtedly to its very much faster growth. One such case is illustrated in an accompanying photograph.

HOW THE G-TREES FORM

The contorted branches show the tendency of this permanently deformed longleaf pine to develop a vertical growing stem.

"The dying of the central terminal stem may be due to any one of several causes, including fire, insect attack, and wind as the most common agencies. Occasionally large sized groups of saplings or small pole trees are thus found topped off in the path of a tropical hurricane. The Nantucket tip moth (*Retinia frustrana* Scud.), which sometimes does much harm to the young growing stems of shortleaf and loblolly pines, seems to accomplish very little injury to the large, well-protected "asbestos" bud of longleaf pine. In isolated cases a freak in burning would no doubt act as the initial cause for the peculiar later development of the tree trunk. An outbreak of some girdling insect working on saplings at about a uniform height above the ground or a severe wind storm offers the most likely explanation for the occurrence in the July number of AMERICAN FORESTRY."

G-TREE OF NORTH CAROLINA

The photograph of this specimen was taken by P. T. Kneale, president of the Woodland Lumber Company, of Philadelphia, near Princeton, North Carolina, in 1912. There were a number of similarly deformed trees in the vicinity.

ONE FORM OF THE G-TREE

By the substitution of a lateral branch for the killed central stem, this slash pine, in about 5 years, has attained a height of 18 feet and a diameter of 6 inches at breast height.

A WHITE PINE G-TREE

Harry D. Tiemann, of the Forest Products Laboratory, at Madison, Wisconsin, sends this photograph of a white pine of G-tree shape on the banks of the Wisconsin River near Kilbourn, Wisconsin.

First Aid To Wounded Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

By J. J. Levison

City Forester of New York City

Simple Methods of Preventing and Treating Injured Bark—a Suitable Work for the Winter Months

EVERY owner of an estate with trees on it has the problem of tree wounds to consider. Every city has streets with horse-bitten trees on them and everyone owning even a single tree may some day find its bark injured by the milkman's horse, by the neighbor's automobile or by some mischievous school boy.

When the bark is thus injured, a tree can no longer produce the proper amount of foliage or remain in a healthy condition very long. The reason for this is clear when we stop to consider the nature of the most important tissue of a tree—the "cambium layer" — and note how it becomes affected by such injury. The cambium layer is a thin tissue located immediately under the bark. It must completely envelop the stem root and branches of the tree. The outer bark is a protective covering to this living layer, while practically the entire interior wood tissue is composed of dead cells and merely serves as a supporting skeleton for the tree. The cambium layer is the real growing part of the tree. It is the principal part which transmits the sap from the base of the tree to its crown; it is the part which causes the tree to grow by the formation of new cells, piled up in the form of rings around the heart of the tree, and it is also the part which prevents the entrance of insects and disease to the inner wood.

From this it is quite evident that any injury to the bark and consequently to the cambium layer just beneath it will not only cut off a portion of the sap supply and hinder the growth of the tree to an extent proportional to the size of the wound, but will also expose the inner wood to the action of decay.

It may be a small wound and may appear unimportant, but if neglected it will soon commence to decay and carry disease and insects into the tree. The tree then gradually becomes weakened, hollow and dangerous, and its life is doomed unless repairs are made.

If the wound is dressed in time recovery is certain; or if a suitable guard had been placed around the trunk of the tree before the injury occurred, serious damage could have been avoided.

CAUSED BY A HORSE BITE

This tree, unprotected by a wire guard, was first injured when a horse chewed the bark. The owner of the house whose front porch it shades could have healed the wound by using a few cents' worth of coal tar and creosote, and putting up a guard. He failed to do so, the wound spread, disease attacked the tree, and this is its condition now.

The most serviceable guard is made of wire netting, ½-inch mesh, No. 16 gauge and cut to a height of six feet. There are many other forms of tree guards used; some more elaborate and expensive than others, but none more efficient. The wire netting guard has the advantage over the others in adapting itself to the tree when it grows in thickness.

In spite of efforts to protect the bark of trees, bruises, cuts and tears occur, and in all such cases the wound must receive immediate and careful attention. Any attempt to force the loose bark to grow back to the tree will fail. In dressing the wound the rough edges of the injured bark should be cut smooth and the exposed wood covered with coal-tar. Coal-tar by itself or in mixture with creosote has an antiseptic as well as protective influence on the exposed wood. Not only for these

reasons is it far preferable to paint for covering wounds, but also because it has the advantage of being more lasting and does not peel as paint does.

Some people bandage the bruise of a tree with burlap or cloth. This is not advisable because disease will set in more readily under the protection of a bandage than it would when the wound is freely exposed to the air. For the same reason the method of covering wounds with tin is equally bad.

When we consider the care required in the treatment of a tree bruise, does it not seem that we are expecting a great deal from the trees that we plant along our city streets? We plant them in a cement pavement, alongside of a deep set curb-stone, with more pavement on the street surface and leave them to draw food and water from the hard packed clay. Then the bark may be injured, the direct channel for sap supply cut off and still we expect them to survive and wonder why they do not.

Owners of trees who see their trees failing and do not know the cause often spend money needlessly in engaging some tree surgeon to treat it. Let us suggest to these people that they write to AMERICAN FORESTRY, describe the tree and its general condition as best they can, and advice as to what to do for it and what is affecting the tree will be given free of charge.

NEGLECT AND THEN DESTRUCTION

This once fine tree, first damaged by boys tearing off a strip of the bark, was neglected. No attention was paid to the wound and the tree gradually rotted until it became so weakened that it toppled over during a wind storm. The owner of the house, lamenting its loss, declared he would have given $100 rather than have the tree destroyed. All he need have given was a few minutes' time and a few cents' worth of coal tar, and a wire guard when it was first injured.

ADVICE FOR DECEMBER

1.—In December fertilize with well-rotted manure all weakened or backward trees and all valuable specimens on the lawn. Dig the manure into the soil around the tips of the roots away from the trunk to the tree. Do not expose the roots and be careful not to mutilate the large roots.

2.—Bolt all trees that are likely to split. The old-fashioned band placed around the trunk or branch of the tree is bound to become too tight for it and eventually girdle it. Bolting is much better, and does not injure the tree.

3.—Commence cutting down all trees marked for removal during the early fall. Segregate the trees infested with boring insects and disease and see that the infested wood is burnt before next May. This applies particularly to such trees as those infested with the hickory bark beetle in hickories, the two-lined chestnut borer in oaks, and the bronze birch borer in birches.

4.—This is a good season to look over your spraying apparatus and to see that the machinery and hose are in good order. You will need the spraying apparatus in early March on your apple and pear trees.

5.—Take care of neglected wounds on your trees, cutting off any loose bark and coating the exposed wood with tar. This will prevent decay and aid in healing the wound.

6.—Repair tree guards on the street and avenue trees. See that they are in good order and that they have not grown too tight for the tree during the past growing season.

QUESTIONS AND ANSWERS

Q. I have a Baldwin apple tree that has not yet come into bearing, which is four or five years old. This fall I have noticed in numerous places a little bunch of blue-white mildew, almost resembling a very small piece of cotton, and where this condition exists, there is a swelling of the branch. Can you tell me just what this is, and the proper treatment for it? During the summer the branches have increased in length to a great extent, the topmost branch of the tree now extending possibly 8 feet high, and the trunk is possibly 2½ inches in diameter. Should a tree of its age be pruned at this time?

H. E. P., *Newark, New Jersey.*

A. From your description I judge that the tree has been infested with plant lice and the best remedy would be to wash the affected parts with a lime sulphur solution, one part of lime sulphur to ten parts of water.

If the branches have grown scraggly and very long, it is well to cut in lightly, making the crown more compact. This should be done in March.

Q. Can you give me advice about the bag-worm and the Tussock moth?

L. B., *Indianapolis, Indiana.*

A. The Tussock moth belongs to the Gypsy and Brown Tail moths and is among the most common in the eastern states. It spends its winter in an egg form, hatches in early June, the caterpillars feeding all of June and part of July, and transforming

into pupæ in July; the pupæ then change into moths. The female moth, a sluggish, wingless specimen, deposits its egg clusters on the bark of a tree, and then it dies, leaving the eggs to remain in the same position all winter.

The best method of combating the insect is as follows: The egg masses should be removed and burned any time from August to May. If the work is done on lawns, the scraping or removing of the eggs should be done over a canvas to enable gathering of the eggs and preventing them from hatching in the grass. On the streets, they may be scraped off on the asphalt and collected afterward. It is also important to be on the lookout for the eggs on fences and at the various other protective places in the neighborhood of the trees because they have a tendency to deposit their eggs on buildings, fences, posts, etc., as well as on the trees.

Another way of combating is to spray the infected trees early in July with arsenate of lead. The idea is to poison the leaves so that the caterpillars feeding on the poisoned leaves become poisoned themselves and die. Banding the trees in early spring with burlap or cotton batting is useful in so far as these bands serve as traps enabling the owner or caretaker to come along and collect the caterpillars under the bands where they have a tendency to gather in masses. The band, however, is not an absolute impediment.

The bag-worm is also sometimes called the basket worm, and produces small caterpillars hidden in bag-like shelters composed of particles of bark, leaves, etc. The insect spends the winter in the egg state. It emerges in form of a young caterpillar in May or early June and feeds on the leaves of trees in the summer. It is most injurious to certain evergreens, especially arbor vitæ, but does damage also to maple, oak, elm, poplar and other species of trees. The remedy consists in (1) collecting and burning the bags all winter, and (2) spraying for the caterpillar in the summer with arsenate of lead, one pound to ten gallons of water.

Q. Will you advise me when it will be best to transplant a copper beech about seven feet in height and what method should be employed.

E. K., *Hackensack, New Jersey.*

A. The best time to transplant your copper beech is in April. Dig the tree and carefully preserve a ball of soil around its roots. Wrap the ball around with burlap to prevent it from breaking in the process of transplanting. Beech are difficult to transplant and the ball of soil is quite necessary. Beech trees can also be moved in the winter time with a frozen ball of soil but early spring is preferable. It is also advisable to trim back lightly the branches at the time of transplanting.

Q. Where can I find information on the proper treatment of natural lakes in city parks? The St. Paul and Minneapolis Park Boards invariably dredge the shores and conventionalize them by a fringe of willows. To me this process takes a large part of beauty and interest away from them.

D. L., *St. Paul, Minnesota.*

A. You can find information on the treatment of natural lakes in city parks in "The Art of Landscape Architecture," by Samuel Parsons in Chapter 8. There is very little else written on the subject. The matter of treatment depends to a very great extent on the purpose and use of the lake, and the individual taste of the designer.

Q. We have a proposition to plant up a swamp near Madison, Wisconsin, with some quick growing trees. They are going to drain it eventually, but before they do they want to make it attractive by planting clusters of quick growing trees and shrubs, probably using several thousand. What kind would you advise planting in that locality?

W. W. M., *Chicago, Illinois.*

A. I believe that you would do best to use the willows, the *Silax alba*, or white willow, being a splendid, quick growing variety. Any of the willows or the dwarf willows would answer your purpose very well. If the ground is not too wet, that is, so that the trees would be under water, you might also be successful with the pin oak and the scarlet maple, both beautiful trees. As to shrubbery, you could use alder, milky dogwood, elder and the various viburnums with success.

Because of the location of the area in Wisconsin, I would suggest that you consult a local nurseryman, or at least one familiar with that section, as to the best varieties of the species I have mentioned for use there. He would, of course, be able to tell you just which ones would be hardiest under the climatic conditions there. It is always best to have the advice of some local man in the business if it is possible to secure it, before going into any extensive planting. But you may safely follow the above general suggestions in making your plans.

Q. I have a little earth plot, but the earth is full of worms which eat the roots of all the plants in my garden. What can I do to kill the worms?

E. W. K., *New York City.*

A. You can bring all the worms to the surface of the ground by pouring a liquid known as "worm eradicator" over the surface of the ground, and if the trouble is caused by rodents you can dip some wheat in strychnine and dig it into the soil around your plants.

Q. Is the ailanthus a good tree to plant? If not, why not?

J. M., *Rome, New York.*

A. The ailanthus has one great advantage over most other trees in being able to adapt itself to the poorest conditions for tree growth where few other species will grow. It is also a well balanced tree and is therefore of great value in planting under certain poor conditions where little else will grow. On the other hand, for general planting, the ailanthus is not to be encouraged in preference to other species. The ailanthus grows quickly and dies quickly. It is shallow-rooted and liable to overturn in windstorm. Its wood is soft and brittle and when the tree reaches the age of thirty or over, it becomes hollow and dangerous.

Q. My tree, I think, has been killed by gas. How can I detect it and how can I recover damages? The tree is in front of my house on the city street.

Mrs. F. McN., *New York City.*

A. Dig around the tree and try to detect the odor of gas. Apply to your city forester and ask him to help you.

Q. Please tell me the best kind of trees to plant for shade in an outer yard where quick returns are wanted. The lot is protected from the wind by a hill. No clay subsoil.

J. H. W., *Cedar Springs, Virginia.*

A. Replying to your inquiry, I do not think you could get any tree more satisfactory for your purpose than the red oak. This is a beautiful shade tree and one of the most rapid growing. It is hardy and healthy also. Another good tree for open planting in a yard for quick shade is the tulip tree, a rapidly growing tree with beautiful flowers and foliage, and splendid for shade. The Carolina poplar is also good, but the other two species are much to be preferred. I enclose our bulletin on the Selection of Shade Trees, which will give you valuable information.

Q. In treatment for hollow trees you recommend a wash made of copper sulphate. Is this the chemical or commercial form of copper sulphate? Where do you obtain it, and how much should it cost? The ordinary druggist does not know what to supply, and therefore recommends something quite different.

R. B. J., *New York City.*

A. The copper sulphate may be secured in commercial form. Get "Bordeaux mixture," which comes prepared and can be obtained at any large seed store. If you have a copy of Levison's "Studies of Trees," read the chapter on cavity treatment. It is full of good information. If you haven't the book and wish it, we can secure it for you. The price is $1.75.

FORESTRY FOR BOYS AND GIRLS

BY BRISTOW ADAMS

Common Sense and Christmas Trees

AVERY nice, kind lady wrote me a letter the other day and asked me to do all I could to put a stop to the slaughter of the poor, little, innocent Christmas trees. I showed the letter to the children and they did not feel that way about it. The writer proposed a number of things to take the place of the tree, but not one of the ideas seemed to find favor. We talked it all over very thoroughly, and then put the question to a vote,—as to whether we would have a tree this year. At the mere prospect of not having one, the two boys were very downcast.

The nearest that we came to falling in with the ideas of the writer of the letter was when Eleanor, the oldest, said that she really did not need a tree, "but it wouldn't be half so Christmas-y without one." Then she added, from the great wisdom of her thirteen years, "The boys are so young yet that they ought to have a little one, at least." The boys did not care to be patronized, and taunted their older sister with the tale of how she had been the one who wanted to cut down three or four trees last year, when we went out to the woodlot.

We did cut three, as I remember. We wanted a spruce or balsam, but were saving the spruces to grow into larger trees, and we could find no balsams. So we got a fairly stocky hemlock. When we got home we bored holes through the stem from all sides, and stuck in branches from the other trees, driving a nail through to hold each branch so it would not twist sideways, or turn down. The extra branches were used for wreaths and for spots of green around the rooms.

When Christmas week was over, we took pruning shears and saw, and cut the tree into fagots right where it stood in the room. Then we burned these, with merry cracklings, in the open fireplace; it gave us a woodsy, camp-fire smell, and we sat around and told stories until every little "smidgeon" was burned up. Of course, we first took off all the tinsel and toys, all the blown-glass and spun-glass figures, the gilded balls and the gay paper chains. These were put away in the Christmas Box, to be brought out again, with some new ones, for the next time.

EVERY year some one starts a crusade against the Christmas tree idea, and every year I wonder why they do not do the same thing against the Easter lily and the football-game chrysanthemum. In Michigan there is a nursery which grows Christmas trees as a regular annual crop; in New England the farmers cut hundreds of thousands out of their fields for the city boys and girls, some of whom rarely get in any closer touch with trees than they do in this holiday season. Every year the dairy farmers in the hill counties of New York welcome the chance to get rid of the spruces which work into their pastures and use up space that might be growing grass for the cows. The more our family has thought about the use of Christmas trees, the more we have been in favor of them.

ONE person says, "let's all do without Christmas trees; or, if we must have them, let every one plant two trees for the one that is used on Christmas." Now that might be a good idea in some few places. But how about the many children who live in tenements in the crowded parts of the cities? Are they to go without this one glimpse of greenness, or attempt to make two trees grow in a paved court-yard? Even in the large and elegant apartment houses the mighty janitor could not provide places for two trees for the children who live there. Oh, yes, there are some apartment houses that take children. I've seen 'em!

Then there are the children on the farm, where father has brought in the home tree from the back pasture, and has sent John down to the freight station,

with forty bundles of trees on the big sleds. He is glad to have that much more clearing done, and to have the work pay for itself. He wouldn't care, I am sure, to have a tree-planting band go out and put in two new ones.

Besides, there is all the trouble and expense of getting the two additional trees, and the very great risk that they will not live after they are planted would make possible a loss of three trees instead of one.

THE best way is to have just as much or as little Christmas tree as you wish, but not to try to make other folks do things your way. In many cases the merriness of the Christmas of the farm child depends on whether there is a good sale for the trees that the farmer hauls to train or town. In any case, could we get the opinion of the tree, it would probably echo what Gertrude said in our discussion: "If I were a tree I'd rather be used in making little children happy at Christmas than in any other way."

HERE are some of the Christmas tree ideas that we have tried, or that we have known other persons to try:

In addition to our own tree indoors we have had another just outside of the living-room windows for the birds. This we string with popcorn and cranberries, and fasten pieces of suet to limbs and trunk. Where we are now, we find that the chickadees and nuthatches are our most frequent visitors; but when we were farther south the tree was gay with the plumage of jays and cardinals. The cardinals were very fond of sunflower seeds; the jays ate all of everything and were a good deal of a nuisance, because they tended to drive the other birds away. We think they are the pigs of the bird tribe.

THEN I have known of city children who played "woodyard" after Christmas, taking the trees from their own homes, and those from vacant lots and ash piles, where they were poor forlorn skeletons of their former selves. All these were cut into short stove lengths, and bundled together, and were then carted around to poorer folks, on bright, new, red, Christmas sleds and 'spress wagons.

ON one of the many festive occasions that they have in the city of Washington, such as "Inaugurations" and the like, a great court was trimmed with upright red cedars, or Virginia junipers. After the great day was over the wreckers were going to cart away and destroy these trees. In the meantime, however, the teachers at the new Normal School got the idea that they could make a pergola of the tall trunks, and gained permission to use them. Part of the projecting branches were left on, so that climbing roses could easily twine around and hold on. This arbor was built not so many years ago; now it is one of the beautiful sights of Washington in summer, and pleasing even in winter.

IN Oakland, California, a man has invented a combined hat-rack, clothes-dryer, and Christmas tree. Folks are always doing such things in that original State. Where there is so much outdoors, they combine all sorts of things to save space. It's nothing at all to go to bed in what had appeared to be the side-board, to find that the bookcase is really a refrigerator, the library table a gas stove, or the jardiniere a talking machine in disguise. So the Oakland man's patent provides for a central tube with holes in it, in which green branches may be thrust. His claim is that it can use boughs trimmed from standing trees and still leave them growing.

USE OF BLIGHT-KILLED CHESTNUT

BLIGHTED chestnut timber resists decay as well as timber from healthy trees, and barked dead wood is much more durable than unpeeled live wood, so far as a three-year test will determine, according to the Forest Service. The blight is otherwise known as the chestnut tree bark disease. In 1913, poles, ties, and posts cut from blight-killed, blight-infected, and healthy chestnut trees were carefully tagged and placed in position. A recent annual inspection of the experiments determined that all of the material was in good condition except for deterioration of sapwood and knots. The sapwood of chestnut is not durable and that on ties and on butts of poles and posts and on unbarked posts is now mostly decayed. Round posts cut from small limby trees suffer early decay in the knots which carry the decay into the post and thus weaken it.

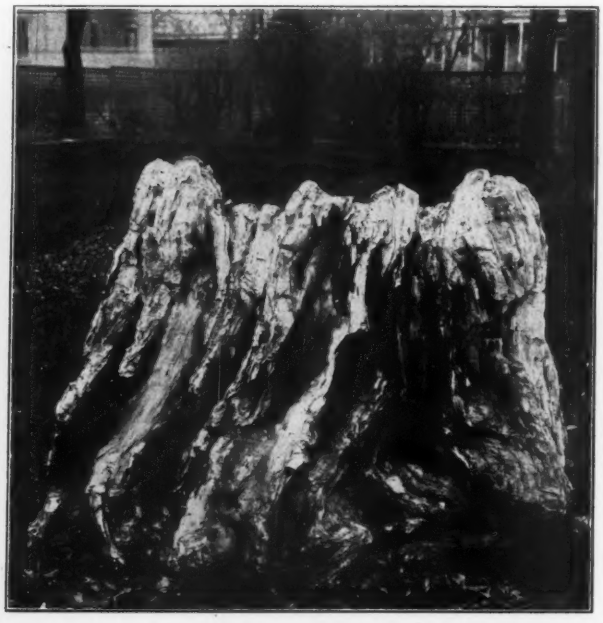
BLIGHT-KILLED CHESTNUT USED

Except for the knot-hole around which decay has set in, this chestnut post from a tree killed by the blight is sound after three years' use.

The chestnut durability experiments to date indicate that blight-killed or infected trees yield timber just as durable as that from healthy trees. In fact, a piece from a seasoned dead tree is more durable than an unbarked piece from a live tree. No one should therefore hesitate to use timber from blight-killed or infected trees for purposes for which chestnut is suitable and durability is a consideration.

A PETRIFIED STUMP

THIS is a petrified hollow stump about five feet in diameter and forty inches high and weighs over seven thousand pounds. It was found by F. W. Pettigrew in a ravine on the west side of the Little Missouri River near the northwest corner of the State of South Dakota. The stump is now in the front yard of the residence of Ex-Senator R. F. Pettigrew at Sioux Falls, South Dakota, having been presented to him by his brother.



A WONDERFUL PETRIFIED STUMP

The stump may be several thousands of years old. It is solid stone, but has the appearance of having been a cottonwood tree. When found, it was full of dirt and half covered by dirt on the outside and was partly exposed to view by erosion. Ex-Senator Pettigrew, who has for many years taken a deep interest in everything pertaining to forestry, had the stump taken from the place where it was found to his home at Sioux Falls.

LIGHTNING shows a marked preference for chestnut trees, according to data based on reports submitted to the Department of Forestry by its foresters. Of a total of about 2,000 trees struck by lightning on the State Forests in the past four years, 655 were chestnut. Pitch pine comes next with 327 trees struck, and then follow in order rock oak, white pine, hemlock, red oak, white oak, black oak, locust, and sugar maple. Black birch is at the foot of the list with only one tree struck in four years. Poplar and walnut come next, only two of each being struck.

Great Forestry Conference and Annual Meeting

SO serious is the danger threatening the white pine trees of this country at the present moment and so certain is it that other tree diseases will be brought into this country unless prompt preventive measures are taken, that the American Forestry Association has called a country-wide forestry conference in conjunction with its thirty-seventh annual meeting.

This conference and meeting will be held at the New Willard, Washington, D. C., on Thursday and Friday, January 18 and 19, 1917.

The meetings will be devoted to four big subjects, each one of national importance. These are:

The Pine Blister Canker Threatening the White Pines of the United States and Canada, and what shall be done in the effort to stamp out the disease where it has appeared, and prevent its spreading into sections where it is certain to go unless proper precautions are taken. This subject will comprise state and national legislation to provide funds for fighting the disease and national and state quarantines to prevent its spreading. The subject will be discussed by the leading experts of the country.

A Federal Quarantine Against Importation of Tree Stock.—Practically all the pests and diseases which have affected, damaged and destroyed trees in North America have been imported from other countries. These diseases and pests are still invading this continent. Some have recently been discovered, others are doubtless developing. Millions of dollars of damage has been done. At the forestry conference will be discussed the advisability of a wholesale quarantine against the importation into North America of tree stock from any other country.

Recreational Uses of National Forests and National Parks.—This is a subject of which the public knows far too little and it will be the aim of the forestry conference to present to those attending, and to the public in general, facts relating to the use of the National Forests by the public for recreation and to improvements in the public service in the National Parks.

Government Aid in Obtaining Economic Justice for Lumber and Forests.—There have within the past year been developments in government co-operation with forest owners and people interested in forest products about which the public knows far too little. What has been done, and what this will lead to will be presented to the forestry conference and will prove of widespread interest.

To this meeting and conference will come not only members of the association but also special delegations appointed by governors of all the states and by the Provincial Governments of Canada, representatives of the forestry and agricultural departments of all the states in the white pine area; of nurserymen's organizations; forest and plant pathologists, city foresters, shade tree commission members, and of all associations interested in trees and forests.

It is expected to be the largest and most important forestry conference ever held in North America.

The Program

The program will be on the following plan:

Thursday, January 18—Morning.

Annual meeting of the American Forestry Association.
Annual address of President Charles Lathrop Pack.
Annual reports of the Secretary.
Address: "Economic Justice for Lumber and Forest."
Election of officers.

Thursday, January 18—Afternoon.

Forestry Conference

Address: "Recreational Uses of the National Forests."
Address: " National Parks as National Playgrounds."
Address: " Forests and Parks as Game Preserves."
Address: " Recreational Problems in the East."
Address: " Recreational Problems in the West."

Friday, January 19—Morning.

Address: "What is the Pine Blister Canker Disease?"
Address: " The Present Situation—
In New England,
Hudson to Mississippi River,
Pacific Coast,
Canada."
Address: " What Can We Do to Fight the Disease?"
Address: " Shall We Plant White Pine?"
Address: " The Problem as a Whole."

Friday, January 19—Afternoon.

Address: " Losses Caused by Imported Tree Pests."
Address: " Domestic Cultivation of Trees Now Imported."
Address: " The Necessity for a Federal Quarantine Against Tree Importations."

There will be full discussions of each of the subjects on the program on the floor of the forest conference.

Members of the Association who expect to attend, and others, not members, who are interested and would like to be present, are requested to notify the Secretary, American Forestry Association, Washington, D. C. Full details will be sent upon request.

The Pine Blister Disease

National and State Legislation and Vigorous Public Action Demanded in the Effort to Retard the Spread of the Deadly Canker which Threatens the Death of the White and Five-Leaved Pines

STEADY progress in the spread of the white pine blister canker or disease, as it is now generally known, is reported from New England, while several new sections where the infection is apparent have recently been discovered. The situation is becoming more and more serious, and it is now apparent that if the extremely valuable white and five-leaved pines of this country and Canada can possibly be saved, no time must be lost in conducting a campaign against the disease.

Experts agree that there should be national and state quarantines to prevent the shipment of white pine, and the currants and gooseberries from which the disease spreads to the pines. A state quarantine is necessary so that the disease shall not be carried by shipments from one state to another, or even from one infected section of a state to another region in the same state, while a Federal quarantine is needed so that a dead line may be established west of the Mississippi River in all the Great Plains states, in the effort to prevent the disease spreading to the very valuable sugar pine of the Pacific Coast.

State and national appropriations will be needed to carry on the work of scouting to discover infected pines, currants and gooseberries; for investigative work in studying the disease and for eradicating it wherever there is an outbreak. This work of eradication will consist of cutting out wild and cultivated currants and gooseberries when infected or when they are considered likely, owing to their proximity to an infected area, to become diseased and thus to aid in spreading the canker to pines near them. This kind of work is hard, slow and laborious, and the expense of it is considerable. It is, however, the only way by which the rapid spread of the disease may be retarded.

There will soon be submitted to Congress a bill providing for an appropriation, doubtless for $1,000,000, for Federal coöperation with the states of the white pine belt in fighting the blister disease, and bills will be introduced in the state legislatures to secure stringent quarantine measures, and to provide money for investigation and eradication work. A model law, covering the situation in the most effective manner, is now being prepared by a committee of experts, and will soon be available. At the same time four experts from all the states in the white pine belt, together with four from each of the infected provinces of Canada, constitute a general committee, the aim of which is a vigorous campaign against the disease.

The American Forestry Association will work in coöperation with this committee, will give widespread publicity to the fact that the disease exists, what it has already done, and what means should be taken to combat it, and will also do all in its power to aid in obtaining the desired state and national legislation, and in endeavoring to secure the quarantine regulations which shall be best suited for the situation as it exists in various states.

At a meeting of representatives of the American Forestry Association and of members of the Committee for the Suppression of the Blister Disease, at Albany, New York, on November 20 and 21, and again in New York City on December 4, plans for the warfare against the blister disease were discussed and adopted, and at the forestry conference at Washington, D. C., on January 18 and 19, under the auspices of the American Forestry Association, the sub-committees from each state, members of delegations appointed by state governors and by the Dominion of Canada, officials and members of the American Forestry Association, will report the progress of the campaign and take up for general discussion and action the most important details regarding it.

The aid of every public spirited citizen is needed to make this work successful. The chestnut blight, to which but little attention was paid when it first appeared, was beyond control when full

CALL TO A FOREST CONFERENCE

CHARLES LATHROP PACK, President of the American Forestry Association, has issued the following statement:

"Expert investigation establishes the fact that the white pine and other five-leaved pines of the United States and Canada are threatened with extinction by the white pine blister canker, a fungus disease imported from Europe. Already the disease has been found in all the New England States, most of the eastern and northern states in the white pine belt and in Ontario and Quebec provinces. It is spreading steadily and unless checked will wipe out our white pines, valued at $260,000,000, as our chestnuts are being wiped out by the chestnut blight.

"The area east of the Hudson River is generally infected. Whether the disease can be controlled in that area or not depends upon whether currant and gooseberry bushes on which the disease propagates and spreads to the pines can be eradicated.

"Between the Mississippi and the Hudson Rivers we have an area infected with scattering infections, but throughout which the disease may be controlled and perhaps suppressed by the enforcement of rigid quarantine laws and every possible and proper precaution. West of the Mississippi is an area which as far as is known is not yet infected but which may be infected unless state quarantine laws keep out of it white pine seedlings and currant and gooseberry stock which may be diseased.

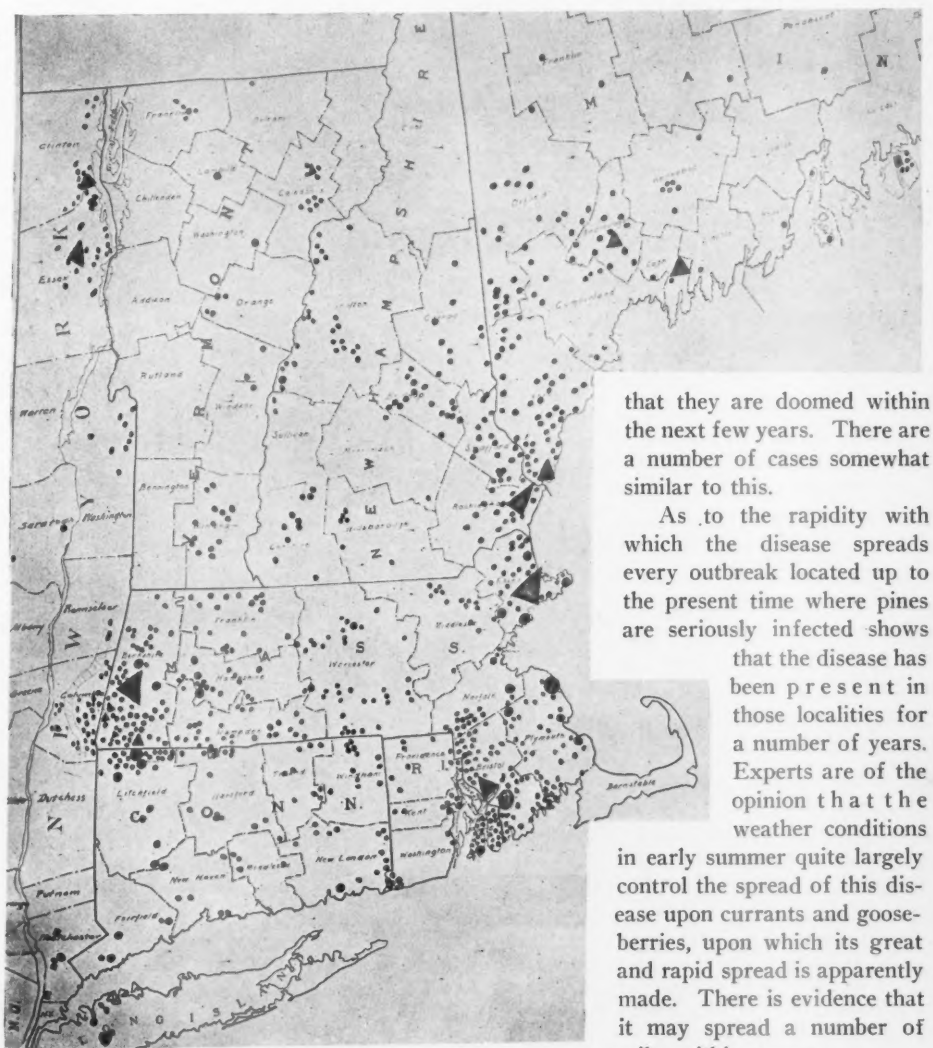
"In view of the imminent danger of the destruction of the white pines, the American Forestry Association will call upon the governors of all states in the white pine belt and the government of Canada to send delegations to Washington, D.C., to attend an international forest conference to discuss measures and formulate plans for fighting the disease, suppressing it, if possible, and saving the white pines of the present and of the future. This conference will take place on Thursday and Friday, January 18 and 19, on the occasion of the Thirty-seventh Annual Meeting of the American Forestry Association."

realization of its danger came, and now the chestnuts are practically wiped out. It is not intended to permit the pine blister disease to get beyond control if it can be helped, and that is the reason why the American Forestry Association and others interested are determined to institute a vigorous and aggressive fight against it with the least possible delay.

Many questions regarding the blister canker are asked, and the most important among them may well be answered in the following paragraphs:

The disease is now located in practically all of New England, in areas of a number of square miles each in New York at Essex, along the lower New York-Vermont border, and the New York-Massachusetts border, and at Tarrytown. There is an area of a number of square miles located on the Minnesota-Wisconsin border, east of St. Paul and extending roughly from the vicinity of Hudson, Wisconsin to Taylors Falls, Minnesota. These are known outbreaks of the disease. The disease has been located in two or three nurseries in New Jersey and Pennsylvania, but so far as is now known there is no outbreak of the disease within these States.

As to the damage already done by the disease, it is very difficult to state because up to this year most of the outbreaks of the disease have been wholly or largely eradicated as soon as found, so that the disease has been immediately stopped at the time of finding it. This year, however, a considerable number of serious outbreaks, previously unknown, have been discovered. The one which probably will give a better idea of what this disease means to this country than any other is located in southwestern Maine. Here accurate counts have shown on quarter acre plots that 85 per cent of the total stand was diseased. Of the infected trees about 50 per cent were already dead or were girdled on the trunk so that they are doomed within the next few years. There are a number of cases somewhat similar to this.



WHITE PINE BLISTER DISEASE IN NEW ENGLAND

The pyramids indicate outbreaks of the infection on native white pine. The squares indicate where infected white pine, currants and gooseberries have been found in nurseries. The dots indicate areas of infected pines, currants and gooseberries.

As to the rapidity with which the disease spreads every outbreak located up to the present time where pines are seriously infected shows that the disease has been present in those localities for a number of years. Experts are of the opinion that the weather conditions in early summer quite largely control the spread of this disease upon currants and gooseberries, upon which its great and rapid spread is apparently made. There is evidence that it may spread a number of miles within a year.

INFECTED WHITE PINE

The blister is here seen in a fruiting condition with myriads of spores to infect the foliage of currants and gooseberries.

The advisability of cutting the affected tree at once or of cutting off affected branches is much discussed. Experts

advise neither course until some state or Government official has had a chance to examine the locality and make recommendations according to the circumstances.

Questions regarding the efficiency of spraying diseased trees are often asked. Spraying is inefficient and is not recommended under any circumstances as a means of control of disease. Spraying of currants and gooseberries might be resorted to in exceptional cases for the purpose of holding the disease in check until further action which may be pending can be decided.

The National Forest Enterprises*

By Honorable David Houston

Secretary of Agriculture

THE value of the national forests to the public and the use made of them increased steadily. Their returns to the Treasury last year, exceeding $2,800,000—an advance of more than $340,000 over the previous year—are only a partial indication of their service. An augmented volume of business, due to a larger number of timber purchasers, and a net addition of nearly three-fourths of a million to the number of stock grazed, together with a decided stimulus in prospecting and mining activities and in the use of the forests for recreation and health, are further indications of broadening development.

Through successful administration the permanence of the national forests is becoming more and more assured. They are now a vital part of the economic life of the regions which use their resources. It is increasingly clear that national supervision and control of them is necessary and that they could not be abandoned without disastrous consequences to western industries and to local welfare.

Road Development in Forests

The need for more ample provision for road development in the national forests was emphasized in my reports of the last two years. At the last session of Congress this urgent need received recognition through the enactment of the Federal Aid Road Act. This legislation constitutes one of the most important and far-reaching steps in national forest development which has been taken for a long time.

Eastern Forests

By making provision for the continued purchase of forest lands in the East, Congress once more has recognized the permanence of the national forest policy. Three million dollars, expendable during the fiscal years 1917 and 1918, has been made available for this work. The purchase of lands in the Appalachian and White Mountains, with a view primarily to the control of stream flow affecting the navigability of rivers, began in 1911. Under the provisions of the Weeks Forestry Act there have been approved for purchase 1,396,367 acres, at an average cost of $5.22 per acre. The lands are in excellent condition and have been secured at very reasonable prices. These newly established forests already are rendering important public service and are being used extensively. There is a marked demand for the timber upon them. The timber is cut in accordance with sound forestry practice. The White Mountain forest in a short time should return to the Government as much as it costs to protect and administer it.

Unwise Legislation

Millions of dollars, appropriated by Congress for the improvement, development and consolidation of the forest holdings, have gone into the properties. Only on the assumption that the forests are to be permanent would expenditures of this character be justifiable. Abandonment of the work after it has been carried to its present point would be a stultifying course. Nevertheless, repeated efforts in this direction still are made. Measures of various kinds, which, if adopted, seriously would injure or even render ineffective the whole national-forest enterprise, are urged. The proposal that the properties be turned over in their entirety to the several states has a waning support and no longer needs to be taken seriously. On the other hand, efforts frequently are made to secure the abolition of individual forests. Proposals to do away with the forests in Alaska still find strong advocates. As pointed out in my last report, such action would be unwise and unfortunate. Action of this sort, however, can be met squarely on its merits, for the question of abolishing a national forest raises a clear-cut issue which the public cannot misunderstand.

A more serious danger to the national-forest system lies in the repeated efforts to open them to the action of some general land grant or to the laws applicable to the unreserved public domain. Each year there are introduced in Congress numerous proposals designed to open the forests, or portions of them, to private acquisition or to disposition of one kind or another. One measure of this character passed both Houses of Congress during the last session and failed to become law only through the presidential veto. It proposed to open the forests to the acquisition of lands by any incorporated city or town for park and cemetery purposes and to counties for park purposes. Every public purpose of the proposed measure can be realized under existing law. So serious would be the effect of such a measure that, if enacted, undoubtedly it would be necessary within a few years actually to abandon a number of important forests. In his veto message, after explaining that the measure was entirely unnecessary and would have unfortunate public consequences, the President said:

* From the annual report of the Secretary of Agriculture to Congress.

"But the most serious objection to the bill is that it subjects the national forests to disposition under a general grant. At the very time while provision is being made for purchase by the Government of forested lands in the East for the protection of watersheds it is proposed to permit similar lands in the West to be permanently alienated. I would respectfully urge that it is unwise to permit alienation of the national forests under general legislation of this sort. If the process of piecemeal distribution is begun, independently of any oversight or control of the National Government, there is manifest danger that the forests will be so disintegrated as to make their efficient administration impossible and the purposes for which they were established unattainable. Against such a process the national forests should be carefully protected."

The use of the national forests for recreation purposes continues to extend. Thousands of local recreation centres, public picnic and camping grounds, excursion points, and amusement resorts are being developed. Some of the areas, located near enough to cities and towns to be reached by considerable numbers of persons, serve already the purposes of municipal recreation grounds and public parks. To meet local needs along this line, the department is coöperating with municipalities. These forms of public service can be rendered without difficulty in connection with the fulfilment of the general purposes of the forests.

National Forests and National Parks

The handling of the national forest recreation resources inevitably raises the question of the relation of the national forests and the national parks. At present there is no clear distinction in the public mind between the two. Both are administered for the benefit of the public along lines which overlap. The parks and forests occur side by side and have the same general characteristics—extensive areas of wild and rugged lands, for the most part timbered, with development conditioned upon road construction and similar provisions for public use. They differ chiefly in the fact that the attractions of the national parks from the recreational standpoint are more notable. Yet this is not always true. Several of the parks are inferior in their natural features to portions of the forests. The need of drawing a clear distinction between national parks and national forests and of a definite policy governing their relation is increasingly evident. Parks are being advocated where the land should stay in the forests, while elsewhere areas which should be made parks continue to be administered as forests—for example, the Grand Canyon of the Colorado.

A national park should be created only where there are scenic features of such outstanding importance for beauty or as natural marvels that they merit national recognition and protection and, on this account, have a public value transcending that of any material resources on the same land—such areas, for example, as those now comprised in the Yellowstone and Yosemite Parks and in the Grand Canyon National Monument. The areas should be large enough to justify administration separate from the forests and the boundaries drawn so as not to include timber, grazing, or other resources the economic use of which is essential to the upbuilding and industrial welfare of the country. In addition, when parks are created from parts of the forests, the portions remaining as forests should not be left in a form difficult or impossible to administer.

Clear-cut Policy Necessary.

The importance of a clear-cut policy is evidenced by the efforts frequently made to secure the creation of national parks out of areas containing great bodies of timber, extensive grazing lands, and other resources, the withdrawal of which from use would be uneconomic and prejudicial to the local and general public interest. In most cases the desire for a specific park, where economic use of the resources also is essential, has led to the proposal for an administration of the area, after the creation of the park, identical with the present forest administration. Several such measures now are before Congress. Their enactment would result in a mere division of the public properties into parks and forests, having no distinction except in name; handled alike but by duplicate organizations in different departments. Still more serious is the fact that the cutting up of the forests would greatly cripple administration of the remaining lands. It would doubtless mean the abandonment of large areas which should remain under public ownership and control for timber production and watershed protection. It would greatly reduce efficiency in forest fire protection and in the handling of current business, increase the expense of protection and administration, and cause endless confusion to users, who in many cases would have to deal with two departments in developing resources when, for instance, logging and grazing units overlap.

The protection of the scenic features and the development of the recreational use of the lands are being taken care of in the national forests. Some of the most unusual scenic areas in the forests are best suited to a full park administration. The bulk of the forest areas, however, should continue in their present status, where they will be fully protected and developed for recreation purposes as a part of the forest administration. The extensive road building, made possible by the $10,000,000 recently appropriated, will open them up rapidly.

An added cause of confusion is the fact that national parks and national forests are administered by two executive departments. While there is an effort to coöperate, nevertheless difficulties arise which could be wholly avoided if they were under one department. Unquestionably the administration of the forests should remain in the Department of Agriculture, because of the close relationship of the work of the Forest Service to the activities of other bureaus of the same department, such as the Bureau of Plant Industry, Bureau of Animal Industry, Office of Public Roads and Rural Engineering, Bureau of Soils, Bureau of Biological Survey, and the Bureau of Entomology. Obviously, there are in the

forests many problems relating to live stock, plant growth, predatory animal and insect control, soil conditions, and road and trail work. These great bureaus are directly and intimately concerned with these problems. If the forests were transferred to another department, that department either would have to duplicate these bureaus in part, or would have all the difficulties of coöperation with another department which seem to be inherent. Whether the National Park Service should be transferred to the Department of Agriculture is a matter for consideration. If the transfer should be made, it would be unnecessary and, in my judgment, unwise to consolidate the work of the two services. The park service should take its place in the organization of the department as an independent bureau, with its activities closely related to those of the Forest Service. Certainly, if the two services are to be administered by different departments there should be the closest coöperation throughout. Such coöperation should include not only the question of the creation of new parks out of national forests, but also fire protection on contiguous properties, game preservation, road building, and other activities.

Editorial

FORESTS AND CLIMATE

FORESTRY in one form or another appeals to every human being. Although we no longer seek the leafy fastnesses, climbing with all fours to escape some prehistoric form of beasts, yet, even in the dawn of history the forest supplied us with game and fuel. The wooden house became the home in place of the cave, and the heart of the home was the hearth. Uses multiplied as standards were lifted. Furniture became a necessity, not a luxury. The inroads upon the forest became heavier. Finally, in many regions, through clearing, burning and intense utilization, the power of the forest was broken and it permanently disappeared. But the traditional reverence for the tree still survives, and we witness in this new land, in a single epoch, and side by side, the greatest and most rapid and beneficial exploitation and use of the forest ever before known, while those who receive these benefits in innumerable forms of which they are hardly conscious, protest instinctively and with all their might against the further spoliation of the woodland domain.

To give solidity to sentiment, which otherwise could make but little headway against necessity, the impressionist turns to the argument that forest destruction means the loss of rainfall, and with it, the decline of agriculture and the establishment of desert conditions in a once populous and flourishing community. These sentiments are then mistaken for the utterances of scientists rather than the theorizing of enthusiasts, and the result is a discrediting of foresters and forestry as based on false generalizations. For it is accepted that forests neither increase nor decrease rainfall as a whole. Deserts are not man-made —else how did the camel develop his form and adaptations. It took millions of years of desert conditions to bring about the structural changes in this animal, just as the neck of the giraffe became elongated for feeding on the tops of dwarf trees grown under similar semi-desert conditions. Ellsworth Huntingdon has shown by the study of growth on the big trees in California that rainfall fluctuates by great cycles, centuries in extent, while the shorter vacillations from wet to dry and back to wet years, with a total swing of about twenty years, are familiar to all old inhabitants, and shown unmistakably by the records of our weather bureau.

It is not necessary to employ this questionable reasoning to bolster up the cause of forest preservation, for there are better arguments, and capable of proof, to justify the maintenance of true forest lands under tree growth. No reasoning can be found to justify a policy of denying to agriculture the use of fertile soils, or to the public the products of the forest, for fear of possible effects upon rainfall if the timber is removed. But upon true forest land, too steep to resist erosion, the forest cover has an enormous influence upon the behavior of this rainfall on reaching the earth. Science, which refuses to be convinced up to this point, has repeatedly shown by actual tests that streams flowing from wooded watersheds are clear, even in flow and continuous, while from denuded slopes similar in all respects, muddy torrents rush down after every rain, to dwindle soon to a mere trickle. These floods destroy the fertile bottoms, fill up reservoirs, and ruin navigation, while the irregular behavior of the streams greatly diminishes the value of water powers. On the headwaters of rivers rising in mountainous country, forests have the same effect as the dams by which the government seeks to regulate the flow of the upper Mississippi River, and in rough topography no dams will do the work of the forest. It is upon this sure foundation, and not upon fanciful, even if fascinating, speculations as to rainfall, that the great construction work of the National Government in the Appalachians and White Mountains is proceeding.

THE LESSON OF THE PINE BLISTER CANKER

THE white pine blister canker continues to spread, and at the time this is written, the problem of its control has assumed gigantic proportions.

So far, we have failed to check it. Why?

To answer that question is to lay bare some of the weaknesses of our easy-going methods and pioneer ideas of government. As a people, we learn chiefly by costly experience, and our memories are short. We do not yet

seem to realize that the average individual is apt to put his private gain ahead of public good, and that there are common interests which must inevitably suffer unless protected by efficient and capable public officials.

If we had no state or national officials to direct and organize the work, what private agencies would undertake to fight the blister canker and to overcome the hostility of interested nurserymen who refuse to sacrifice their business profits or the selfish obstinacy of land owners who will not permit diseased pines to be removed because they are still picturesque.

Previous to 1912 there was no means of preventing private importations of white pine from Europe. Yet, in 1909 the disease had been extensively advertised when trees shipped to New York from a German nursery were discovered to be so badly infested that on opening the packages the spores rose in clouds of yellow dust. Plantations of white pine made on state lands in New York from imported stock were promptly eradicated, root and branch, by the state foresters, in spite of healthy appearance and rapid growth. But importations continued during this three-year period, and some who should have known better shut their eyes to the risk and imperilled the safety of our most valuable timber trees because unwilling to face the possibility of a slight monetary loss at the start. We now know the result. In 1912 the Federal Horticultural Board, a new body designed to cope with problems of this character, prohibited further importations of white pine, thus placing a secure and thief-proof padlock on the barn door. Nearly four years afterwards, the nation has awakened to find that the horse is gone, and that the animal has travelled so far that his recovery is almost despaired of.

The disease works slowly and insidiously on pines, but once broken out into eruptions of reddish spores, which process may take two to six years, it jumps to the currant and gooseberry leaves and spreads rapidly before the wind.

We know now that nothing but the extermination of all imported white pines promptly upon the discovery of the disease would have effectually stopped this spread. But this summary action, taken by New York, was not duplicated by other states, by nurserymen, or individuals, nor was there any organized effort on the whole to follow up the private nurserymen, shippers of ornamental stock, whose infected trees, in small lots, had been widely sold before the disease had become known. The National Government is without the power to destroy private property. The states were apathetic. The Federal Horticultural Board, appealed to in order to secure an interstate embargo on the shipments of pines and currants, did not feel justified in imposing this burden on private enterprise, but requested nurserymen to refrain from shipping currants or gooseberry bushes to the Rocky Mountain states.

This suggestion was indignantly scorned by the Middle West, which thought itself free from the disease and had been refused protection against the East. But in May of this year the blister canker was discovered in Wisconsin and Minnesota along the southern border of the great white pine areas of those states. Its source was traced directly to foreign stock sold by an Illinois nursery in 1908 to a firm at St. Croix Falls in Wisconsin, and from there purchased and introduced into two commercial nurseries in Minnesota on ornamental white pines. Eight years have already elapsed since the first diseased trees were set out in Wisconsin—it may now prove too late to stop the spread of the disease in these states.

The test of a civilization is its ability to meet new dangers, and to quickly adapt itself to unexpected situations. Confusion, hesitancy, differences of opinion, lack of initiative, opposition to energetic measures, and confession of failure before the fight is begun, are qualities that would endear us to possible enemies, for they show a total lack of ability to resist invasion.

What is the lesson? We must have men in public service who are trained to their duties, and then keep them there. We must be guided by expert opinion, and not too blatant in demanding our individual right to do as we please. Wherever effective public action is taken to combat this disease, the officials in charge of the work must be trained men, foresters or plant pathologists, with a practical as well as a scientific viewpoint.

Whatever is the outcome,—whether the white pine is to go the way of the chestnut or continue as our most valuable of all forest trees,—we must now adopt measures to prevent the importation of other tree enemies. We do not intend, if we can avoid it, to let our remaining forests burn up as of old, nor fall a prey to any other new and devastating imported bug or fungus enemy.

GREAT FRIEND OF FORESTRY DEAD

JOSHUA L. BAILY, an ardent and enthusiastic supporter of forest conservation, died in Philadelphia a few days ago, and the cause of forestry has lost a friend who did much to encourage it. Mr. Baily was for many years a vice-president of the American Forestry Association and seldom failed to attend a meeting, numbering as he did, his activities for the conservation of the forests as one of his chief duties as a wide-awake and far-seeing citizen. One of Mr. Baily's recent acts for the cause was typical—he made forty of Philadelphia's public schools subscribing members of the Association, thereby providing thousands of school children and hundreds of teachers with information about the forests which will make them lovers and protectors of trees and woodlands.

What Readers Think

"We have certainly enjoyed to the fullest measure the wonderfully rich and varied departments of the truly beautiful AMERICAN FORESTRY. I regard it as especially interesting and inspiring to all naturalists, foresters and arboriculturists, and personally I wish to heartily thank the editorial staff for the very high standard of their work."

CHARLES S. MANN,
Hatboro, Pa.

"Glad to see you expand and interest a greater audience, for technical forestry alone cannot hope to hold a general public indefinitely."

FILIBERT ROTH,
Ann Arbor, Mich.

"Last Saturday I bought the February edition of the AMERICAN FORESTRY magazine quite by accident, but am so delighted with it that I am herewith sending a P. O. money order for $3.00, for which please credit me with a Subscribing Membership in the American Forestry Association."

LYLE L. ALLEN,
Brooklyn, N. Y.

"I am glad to hear that The American Academy of Arborists has chosen AMERICAN FORESTRY as its official organ. Allow me to congratulate you upon the splendid magazine that you are now putting out. It is a great improvement over the earlier forms. It is certainly a good deal more attractive in appearance and the subject matter is equally more attractive."

CHARLES S. SCOTT,
Manhattan, Kan.

"AMERICAN FORESTRY is grand. In variety of subjects, method of presentation, and whole 'make up' it is on a high plane —almost ideal. You are certainly to be congratulated. If the present standard is maintained, the subscription list can scarcely fail to increase."

WILLIAM W. LAZENBY,
Columbus, Ohio.

"I surely am greatly interested in my magazine, and it is becoming wonderfully attractive and informing."

MRS. D. WILLARD,
Riverside, Cal.

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E. WHEELER WHITMORE,
New York City.

"I have received AMERICAN FORESTRY, and am much pleased with it. It is well worth the subscription price."

A. K. MOODY,
Seattle, Wash.

Inspect Logging Operations

To give the students of Wyman's School of the Woods (Munising, Michigan) an opportunity to study the different logging operations as actually carried on in the north woods, the entire school went on a week's packing trip through the Upper Peninsula of Michigan and inspected some of the largest camps now in operation in that region and got many good "pointers," some of which can never be taught in the class-room.

Planting Shade Trees

"We have planted a number of ornamental shade trees on our country courthouse grounds with dynamite," writes C. N. Morton, County Commissioner, Sterling, Colorado. "The soil was heavy clay loam. The result of the action of the dynamite in loosening and shattering the soil to a great depth was very marked. The trees planted in these dynamited holes made a surprisingly greater growth than trees planted previously in spade dug holes.

The Pocono Association

The annual meeting of the Pocono Protective Fire Association of Monroe County, Pennsylvania, was held at Stroudsburg recently. Receipts amounting to $1,416.69 and expenditures amounting to $1,276.69 left a substantial balance in the hands of the Treasurer. This favorable condition was due, in some degree to the coöperative agreement existing between the State Department of Forestry and the Association, under Act of Assembly, by which the State returns to the Association one-half of the amount paid out by the Association for forest protective work. About six hundred dollars was returned by the State under this agreement. Fifty-six new members were elected during the year, the roll of membership amounting to 244. Forest fires, both spring and fall (to November 16), for the whole county, burned over only 582 acres, a marked contrast to the year 1915 when over 12,000 acres were burned over in the month of April. The general report of the directors enumerated a series of activities that plainly showed progress and prosperity for this private forest protective organization.

Tree-Planting Campaign

In connection with a tree-planting campaign recently instituted by the Rotary Club of Pottsville, Pennsylvania, an illustrated lecture entitled "Trees as a Municipal Asset" was given in the Auditorium of the Pottsville Y. M. C. A., by E. D. Kains, through whose efforts the Pennsylvania Shade-tree Act of 1907 was adopted in his home town, Wyomissing, near Reading, Pennsylvania, and who is a very earnest advocate of the principle of municipal control of shade-trees. The lecture has been given in a number of Pennsylvania towns and cities, and includes a very complete series of lantern slides showing the various activities of a municipal shade-tree department, such as proper methods of planting, tree butchery vs. scientific pruning, injury of trees by horses, tree surgery and the control of insect pests. The ten best species for street planting were illustrated by a series of beautifully colored slides, including some of the finest streets in America and Europe.

A Forest Enthusiast Dead

Forestry lost an enthusiastic supporter in the death on November 22 of Jacob Nolde of Reading, Pennsylvania, a life member of the American Forestry Association. Mr. Nolde did much for the forestry movement in Berks County, started two years ago and now so successfully conducted by the Berks County Conservation Association, while the forest planting on his own estate, under the charge of William G. Kohout, is one of the most extensive in the east and is a striking example of what can be done by intelligent reforestation.

Canadian Department

By Ellwood Wilson
Secretary Canadian Society of Forest Engineers

Director of Forestry R. H. Campbell has just been visiting the Laurentide Company, Limited, plantations at Grand'mere. There are about 400 acres of plantations all the way from one year to four years old. These consist of Norway Spruce and Scotch Pine in mixture; Scotch Pine; White Pine, and Norway Pine in mixture; and Norway Spruce in pure stand. The Norway Spruce has also been planted in the open under the shelter of White Birch and Poplar, and also underplanted on land which has been logged over. The plantations are doing very well—the loss in Norway Spruce being less than one per cent, and all of the plantations are now beginning to show up in first class shape. A visit was also paid to a lumbering operation on land which had been heavily cut over for soft wood, the remaining stand consisting of large Hemlock and hard wood, mostly White and Yellow Birch, and Maple, and small Spruce, Balsam and Cedar. Practically all of the hardwood has been removed so as to give an opportunity for the soft wood reproduction to take place, and, where this has failed, planting operations will be begun next Spring. Fire lines have been cut, and all the brush cut from them, and in cases operations have been burnt, and this has left the ground in good shape, and is a good example of what can be done along these lines. Mr. Campbell expressed himself as well pleased with the Laurentide Company's operations.

The Canadian Forestry Association has taken up with the governments of Manitoba, Saskatchewan, and New Brunswick, the question of introducing legislation looking to making "fire permits" compulsory throughout these provinces. The response met with has been favorable, and we hope that the legislation will be passed at the coming session. This will practically make a "Dominion-Wide Permit System" for protection against forest fires, and will be a long step toward the conservation of Canada's natural resources.

The following letter has been received from Mr. A. H. Unwin who is in the British Forestry Service in Nigeria, Africa. Mr. Unwin was formerly in the Dominion Forestry Service, and is a member of the Canadian Society of Forest Engineers. The letter is as follows: "In Nigeria I am in charge of the Working Plans Division, but since I came back this time I have been transferred to the British Sphere of the Cameroons (late German Colony) to report on the plantations and forests as well as the Agricultural resources. Needless to say the Southern Forests, such as I have seen of them, are grand with plenty of Mahogany of various kinds, besides Ebony, rubber and bullet wood, also ironwood. Most of the land is really covered with forest, except for the small clearings of the natives here and there. The Germans had not developed the timber industry in this part very much; in fact, compared to Nigeria, they had been very slow in taking up Forestry and only had six men in all, compared to Nigeria's sixteen at the same date. They had, however, done a certain amount of planting at the District Stations, chiefly with Teak, rubber Cocoa, Indian blackwood, as well as what they called German Steamer. I cannot quite make out what they meant by this. They had planned to plant in the drier regions away from the Coast, but little had been done before the war. Now we will hope they will not be allowed to return. Several large rivers for floating logs are found both North and South, notably the Cross River and the Mungo, as well as four other rather smaller ones, the Akwayefe, Ndian, Moko and Meme. On the whole too it is quite a mountainous country, the Cameroon itself being 13,000 feet high, and then there are several ranges, such as the Rumpi, 4000 odd, on which there are good stands of timber. The chief difficulty in dealing with tracts is that there are so many different species on a given unit of area that it is almost impossible to make it pay with any great length of haul to a waterway. I have found as many as 73 species of trees in a valuation survey two chains wide and three miles long, and that is not a large number. The known species of timber trees regardless of shrub trees in this part is about 300, quite apart from the unnamed trees. It is like a vast arboricultural collection, all mixed up without labels, and overgrown with creepers and undergrowth into the bargain."

The Dominion Royal Commission which was appointed in 1914 to look into the relations with Great Britain and her Colonies, and to examine into their natural resources, discontinued its sittings last year on account of the war, but has resumed them this year. These sittings have been held in the cities of the West and the Commission has just reached this part of Canada, where the meetings were held in Toronto, Montreal, and Quebec. At Toronto Dr. B. E. Fernow, Dean of the Faculty of Forestry at the University of Toronto, advocated federal jurisdiction over the licenses for cutting timber in Canada. At present, he said, each province regulated its own license system, and as a result there were wide differences between the laws of the various provinces. For instance, in Ontario a license could cut, without limit, whereas in Quebec the operations were subject to a number of important restrictions. Dr. Fernow commended the work of the Forest Branch of the Department of the Interior in organizing fire protection on the Dominion Forest Reserves, and drew attention to the fact that Ontario had fallen far behind in its fire protection policy. Ontario was badly in need of a system of protection similar to that of British Columbia, which included lookout towers, telephones, trails and organized fire fighting forces. He said that Canada's total stand of timber was between 500,000,000,000 and 600,000,000,000 feet, and that the cut in any one year had never exceeded 5,000,000,000 feet, so that the supply might be considered inexhaustible or at least reproducible, by merely keeping fire out of the forests.

In Montreal forestry was spoken for by Mr. Ellwood Wilson of the Laurentide Company, Limited. Mr. Wilson rather startled the Commission by stating that if strict measures of conservation and reforestation were not adopted immediately on this continent within the next sixty-five years the pulp supply of Canada would practically have disappeared. It was also stated that three things were essential to the protection of the industry in this country; one was the adoption of a scientific scheme of reforestation; another a proper system of forest fire protection, such as had been adopted in British Columbia and on the land under the control of the Laurentide interests on the Ottawa and St. Maurice Rivers, and also a system that would do away with the dangerous disposal of waste that now prevails in the forests throughout Canada. It was also stated that during the past thirty-five years thirty per cent of the wood pulp of Canada has been burned over and rendered useless for generations to come. Since 1908 when fire protection was first introduced on a scientific basis the decrease in waste has been most marked.

In Quebec Mr. G. C. Pichè, Forester to the Quebec Government, gave his testimony about Quebec conditions.

This Commission is composed of representatives from England, Ireland, Australia, New Zealand, Canada and South Africa, and is amassing a large amount of useful and interesting information which will be a great help to the British Empire in mobilizing their resources for a campaign for the increase of trade after the war.

For fire protection and prevention in Dominion Parks the Government has adopted portable fire engines which have remarkable capacity. Mr. J. B. Harkin, Commissioner of the Dominion Parks Branch of the Department of the Interior, Ottawa, in coöperation with Mr. J. C. Johnston of the Railway Commission Fire Branch, has adopted an engine which was completed last spring. Its weight, stripped, is 118 pounds, and, equipped, with solid oak base, etc., for work, 143 pounds. The engine is rated six horse power. It delivers twenty gallons of water a minute through 1500 feet of hose.

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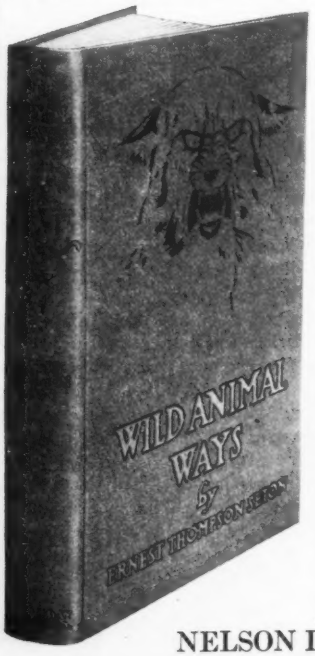

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Book Reviews

The Book of Forestry, by Frederick F. Moon, Professor of Forest Engineering, New York State College of Forestry, $1.75. D. Appleton & Co.

A practical book on forestry which is up-to-date and intelligible to junior readers, and which is neither too technical for immature minds nor too popularly written for grown-ups. It is not a text book, nor an instructive manual, but rather a book of information on our original forests and the forestry movement in this country—its origin and present status. It will be of great assistance to boys who love the woods and wish to learn more about our trees and it will be especially helpful to Boy Scouts who are anxious to obtain merit badges on conservation, forest protection or fire prevention. Besides the chapters on the life of the forests and the activities of the lumber and log drive, there is one devoted to the general subject of conservation in which control of all natural resources, water, gas, oil and mineral, is advocated and the reason therefor given.

Our Field and Forest Trees, by Maud Going, $1.50. A. C. McClurg & Co.

It is the story of the trees that Miss Going tells from the time that Nature plants the seed until the tree's maturity. Unlike most nature books which begin in the spring, this opens with the sowing of the seed in the autumn when the life of the tree really commences. The reader is then taken through all the stages of tree life and is told how the tree grows, how it lives, and what the leaves are for, etc., etc., together with a lot of wonderfully interesting tree and forest lore.

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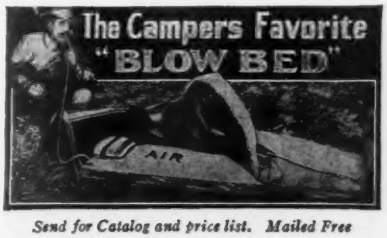

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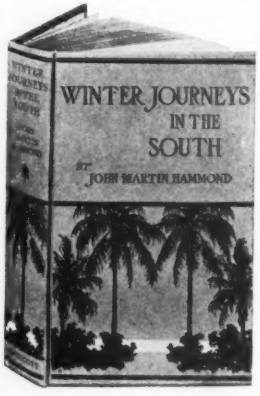

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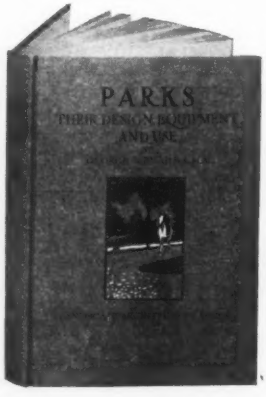

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A Service Organization

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The National Lumber Manufacturers Association is authorized by its charter:

"To gather and disseminate information upon the production and shipments of lumber, market conditions, and the supply of forest products; to make technical and other investigations of the properties and uses of woods; to promote uniformity and efficiency in the methods of manufacturing and distributing lumber and allied products; to establish, maintain and furnish, either directly or through the medium of other corporations, firms or persons, credit rating, collection, legal and traffic service for the benefit of the lumber trade; to promote the use of forest products by all lawful means, and to furnish all lawful information concerning the manufacture, use and sale of forest products."

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilisation of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal coöperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, nonpolitical departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by coöperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

PRESS OF J. B. LIPPINCOTT COMPANY, PHILADELPHIA

He walked with Kings

He could not know, standing there in his bare feet and his rough clothes, with his little schooling, that kings would do him honor when he died, and that all men who read would mourn a friend.

He could not dream that one day his work would stand in Chinese, in Russian, in many languages he could not read—and from humble doorman to proudest emperor, all would be gladdened at his coming.

He could not know that through it all he would remain as simple as democratic, as he was that day as a boy on the Mississippi

Frontispiece of "The Boy's Life of Mark Twain" by A. B. Paine

MARK TWAIN

He made us laugh, so that we had not time to see that his style was sublime, that he was biblical in simplicity, that he was to America another Lincoln in spirit.

To us, to everyone in the United States, he was just Mark Twain—well-beloved, one of ourselves, one to laugh with, one to go to for cheer, one to go to for sane, pointed views. Now he is gone, the trenchant pen is still. But his joyous spirit is still with us. Mark Twain's smile will live forever. His laughter is eternal.

He Was a Great Man; So His Works are Great

The road ahead of that boy on the river bank was a hard one. Before "Mark Twain," a distinguished, white-haired man, and the King of England walked and talked together, his path was set with troubles that would have broken a weaker spirit. It was a truly American story—a small beginning—little schooling—hard work—disaster—good humor—and final, shining, astounding success.

He fought with poverty, he fought with disaster, he lost those dearest to him. But he won.

Because he was of high and brave intellect, because he had humor as deep and as true as the human heart, and because he had struggled with life, he was a great man. So his works are great.

As Children We Loved Him

They say that children know the inwardness of things. A child knows the heart of a man. We as children instinctively knew Mark Twain was so much greater, so much truer than anybody else that there was no one to compare him with.

Now grown up, we know the reason why. He had the heart of a child: he had the style of a master, he had a character of rare beauty.

The Great American

He was *American*. He had the idealism of America—the humor, the kindliness, the reaching toward a bigger thing, the simplicity. In his work we find all things, from the ridiculous in "Huckleberry Finn" to the sublime of "Joan of Arc,"—the most spiritual book that was ever written in the English language, of serene and lovely beauty as lofty as Joan herself. A man who could write two such books as "Huckleberry Finn" and "Joan of Arc" was sublime in power. His youth and his laughter are eternal; his genius will never die.

Why This Half Price Sale Must Stop

Mark Twain wanted everyone in America to own a set of his books. So one of the last things he asked us was that we make a set at so low a price that everyone might own it.

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So we have made this set. And up to now we were able to sell at this low price. But a thing has happened that Mark Twain could not foresee.

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